PIONEER®
The Art of Entertainment

Service Manual

CD CDV LD PLAYER

CLD-V820 KUC/CA

- **Refer to the service manuals ARP2316 (CLD-2590K) and ARP2334 (CLD-V820).**

- **This manual is applicable to CLD-V820/KUC/CA.**
- **File this manual with the two manuals above.**

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- *Part without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

CLD-V820/KUC and CLD-V820/KUC/CA have the same construction except for the following:

Mark	Symbol & Description	Part No.		Remarks
		CLD-V820/KUC	CLD-V820/KUC/CA	
	Packing case	VHG1190	VHG1217	
	Operating instructions (French)	.....	VRC1008	

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PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
ARP2334

CD CDV LD PLAYER

CLD-V820 KUC

- **Refer to attached service manual ARP2316, CLD–2590K.**
- **This manual is applicable to the KUC type.**

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING
Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).
When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

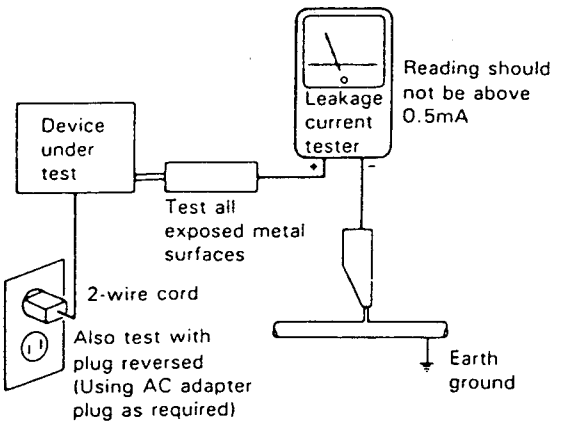
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. CONTRAST OF MISCELLANEOUS PARTS

NOTES:
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

The CLD-V820/KUC type is the same as the CLD-2590K/R type with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		CLD-2590K/R type	CLD-V820/ KUC type	
⊙	MOTHER assembly	VWM1223	VWM1240	
	MAIN assembly	Non supply	Non supply	
	Power supply board assembly	VWR1109	VWR1098	
⚠	Strain relief	CM-22	CM-22C	
⚠	AC power cord	VDG1034	PDG1015	
⚠	Voltage selector	VSB1005	.....	
	Front panel assembly-S	VXX1634	VXX1675	
	Front door assembly-S	VXX1637	VXX1676	
	Packing case	VHG1187	VHG1190	
	Operating instructions (Spanish)	VRK1002	.....	

MAIN ASSEMBLY

The MAIN assembly of CLD-V820/KUC type is the same as the MAIN assembly of CLD-2590K/R type with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		CLD-2590K/R type	CLD-V820/ KUC type	
	D203, D204	.....	1SS254	
	C214	CCSQCH050C50	CCSQCH270J50	
	C305	.....	CEAS100M50	
	C289	.....	CFTXA393J50	
	R207	RS1/10S221J	RS1/10S102J	
	R291, R292	.....	RS1/10S123J	
	R293	.....	RS1/10S472J	
	R588	.....	RS1/10S750J	
	L205	.....	LAU4R7K	
	JA6 RF pin jack	.....	VKB1029	

● P.C.B's PARTS LIST

NOTES:
- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)
- 560 Ω → 56 × 10^1 → 561 ..... RD1/4PS 5 6 1 J
- 47k Ω → 47 × 10^3 → 473 ..... RD1/4PS 4 7 3 J
- 0.5 Ω → 0R5 ..... RN2H 0 R 5 K
- 1 Ω → 010 ..... RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).
- 5.62k Ω → 562 × 10^1 → 5621 ..... RN1/4SR 5 6 2 1 F

Mark	No.	Description	Part No.

POWER SUPPLY BOARD ASSEMBLY (VWR1098)

SEMICONDUCTORS

IC202	TH5P4
IC213, 214 IC PROTECTOR	ICP-N50
IC215 IC PROTECTOR	ICP-N38
Q201 TRANSISTOR	2SB1331
Q202	DTC114ES
D201, 202 DIODE	S3LA20
D203 DIODE	S3S4M
D204 DIODE	ERB83-006
D205 DIODE	D1NL20
D206 ZENER DIODE	MTZ7.5B
D207 ZENER DIODE	MTZ6.2B
D209, 210 DIODE	D1NL20
D213-215 DIODE	D1NL20

COILS/TRANSFORMERS

L203 FILTER	VTL1008

OTHERS

FU211, 212 MICRO FUSE	PTO.5A

CLD-V820/KUC

● SCHEMATIC AND P.C. BOARDS DIAGRAM
OVERALL WIRING DIAGRAM

1. RESISTORS:
Indicated in Ω , 1/4W, 1/8W and 1/8W, ± 5% tolerance unless otherwise noted kk Ω , M;M Ω , (F); ± 1%, (G); ± 2%,(K); ± 10%, (M); ± 20% tolerance.

2. CAPACITORS:
Indicated in capacity (μF) /voltage(V)unless otherwise noted p;pF. Indication without voltage is 50V except electrolytic capacitor.

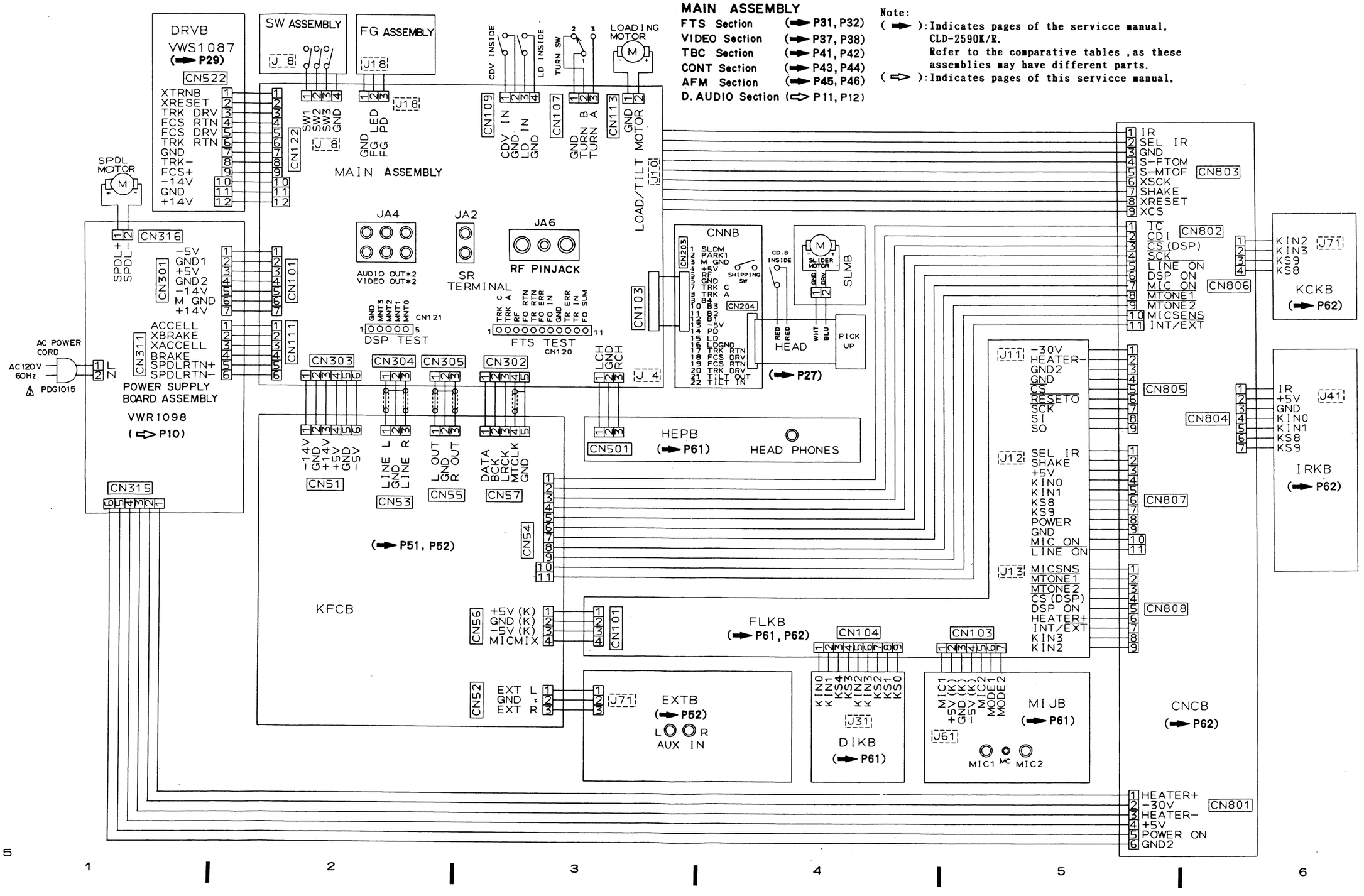
3. VOLTAGE, CURRENT:
▭ ;DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA ;DC current at no input signal.

4. OTHERS:
➡ ;Signal route.
⊘ ;Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

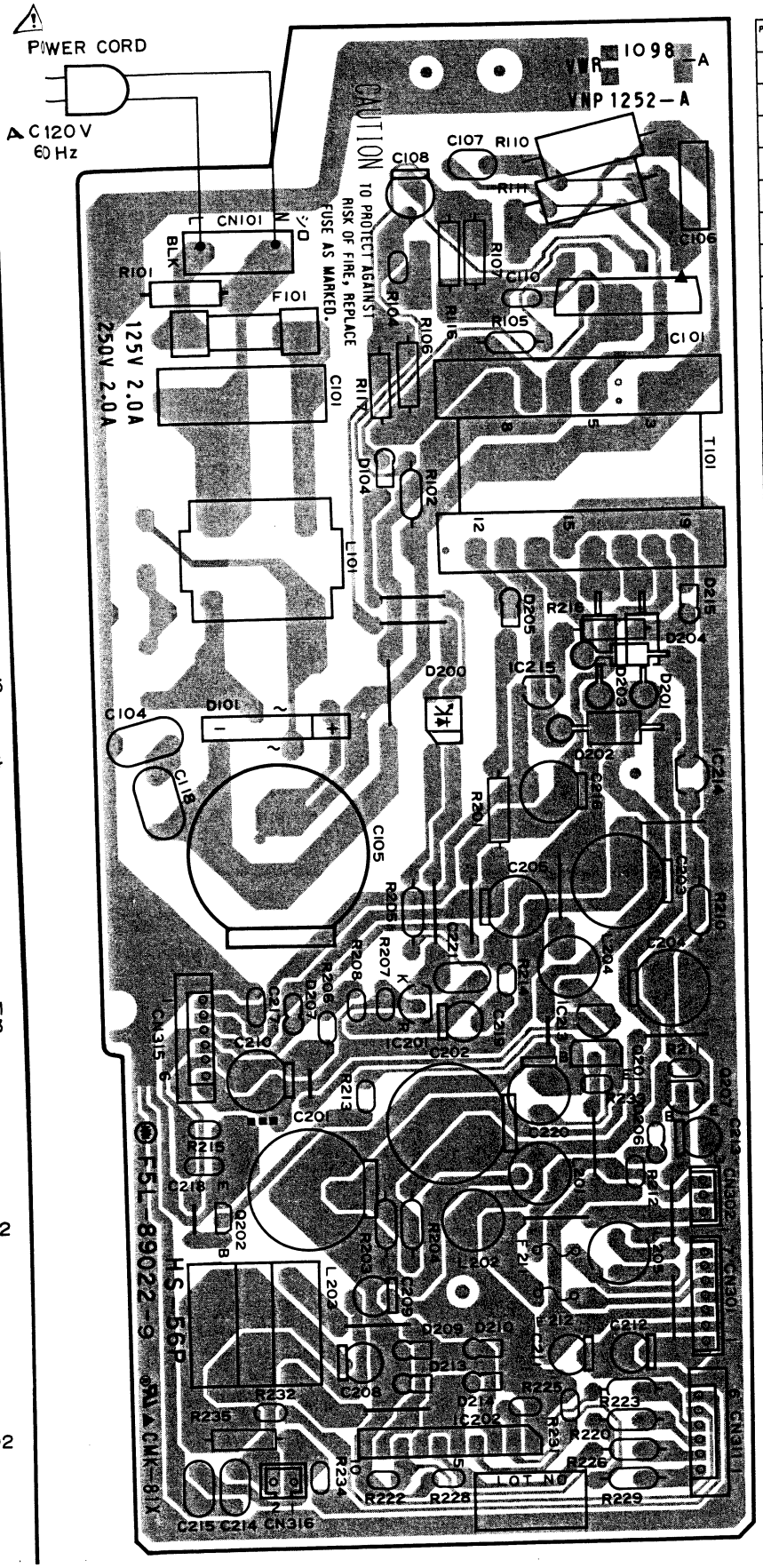
MAIN ASSEMBLY
FTS Section (➡ P31, P32)
VIDEO Section (➡ P37, P38)
TBC Section (➡ P41, P42)
CONT Section (➡ P43, P44)
AFM Section (➡ P45, P46)
D. AUDIO Section (⇨ P11, P12)

Note:
(➡):Indicates pages of the servicce manual, CLD-2590K/R.
Refer to the comparative tables ,as these assemblies may have different parts.
(⇨):Indicates pages of this servicce manual,



- View from component side

POWER SUPPLY BOARD ASSEMBLY (VWR1098)



P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

• View from soldering side

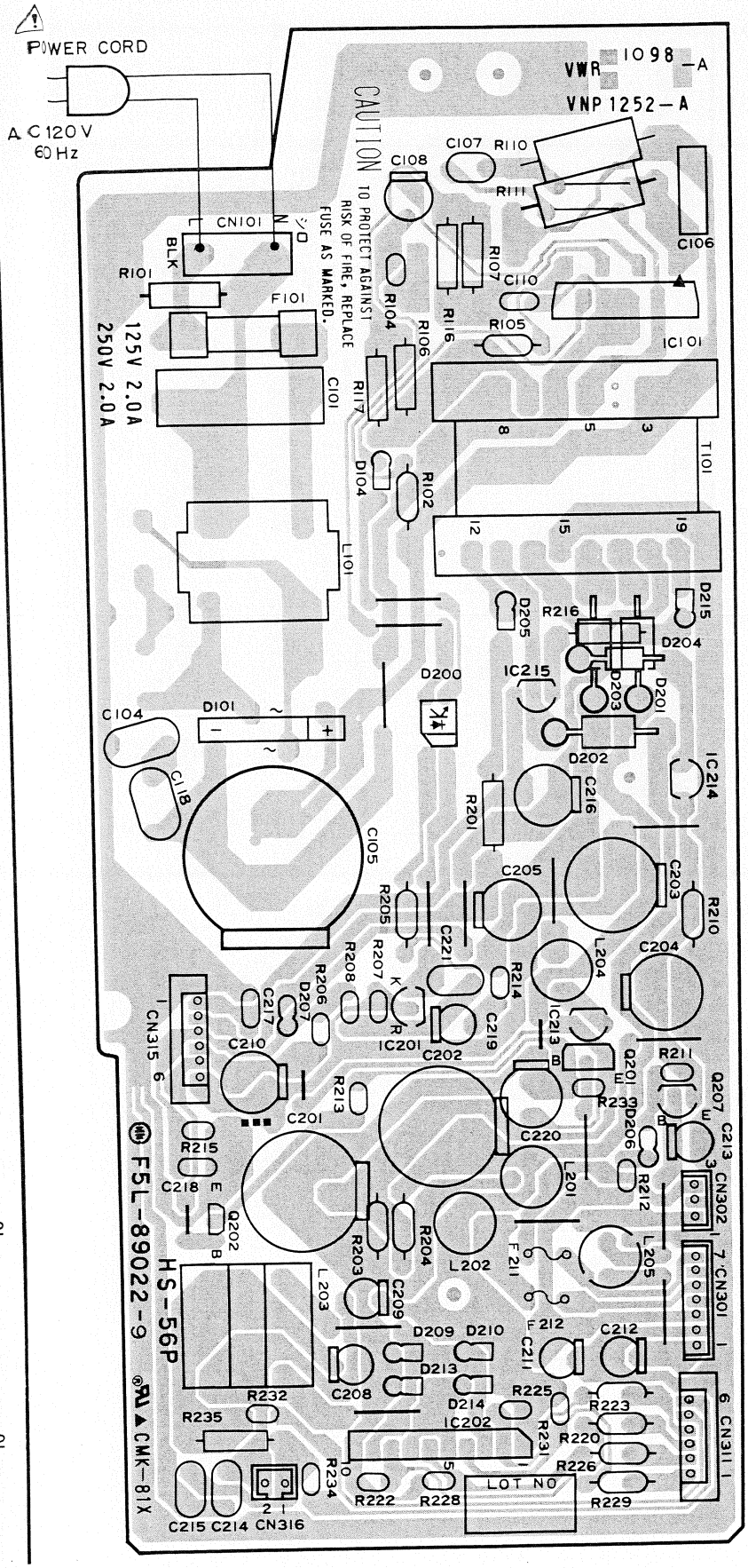
POWER SUPPLY BOARD ASSEMBLY
(VWR1098)

• View from soldering side

POWER SUPPLY BOARD ASSEMBLY
(VWR1098)

• View from component side

POWER SUPPLY BOARD ASSEMBLY (VWR1098)



P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

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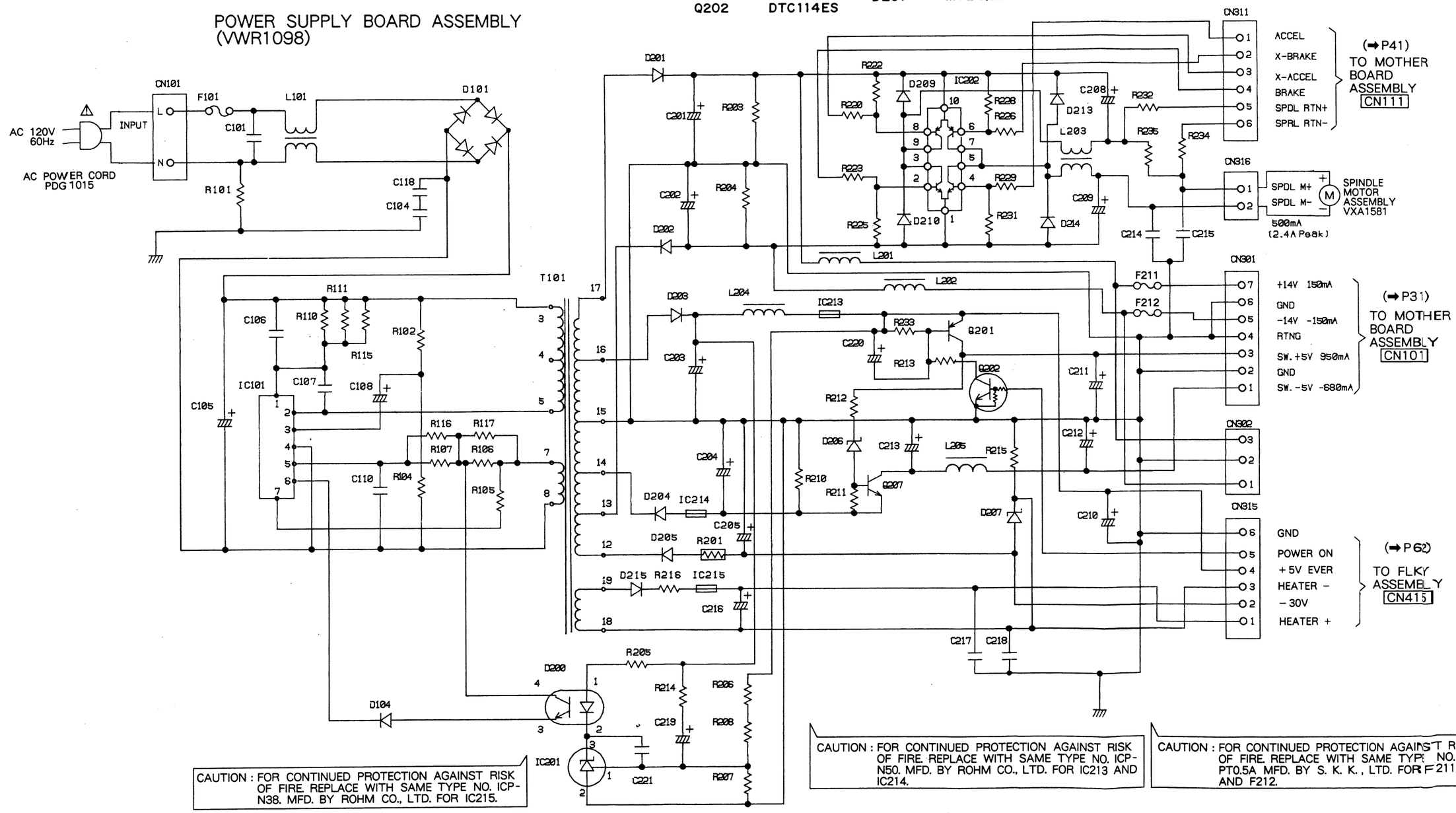
5. The transistor terminal marked with ▭ shows emitter.

POWER SUPPLY BOARD ASSEMBLY (VWR1098)

IC202	TH5P4	D201,202	S3LA20	D205,209, D1NL20
IC213,214	ICP-N50	D203	S3S4M	D210,D213-215
IC215	ICP-N38	D204	ERB83-006	
F211,212	PT0.5A	D206	MTZ7.5B	
Q201	2SB1331	D207	MTZ6.2B	
Q202	DTC114ES			

POWER SUPPLY BOARD ASSEMBLY
(VWR1098)



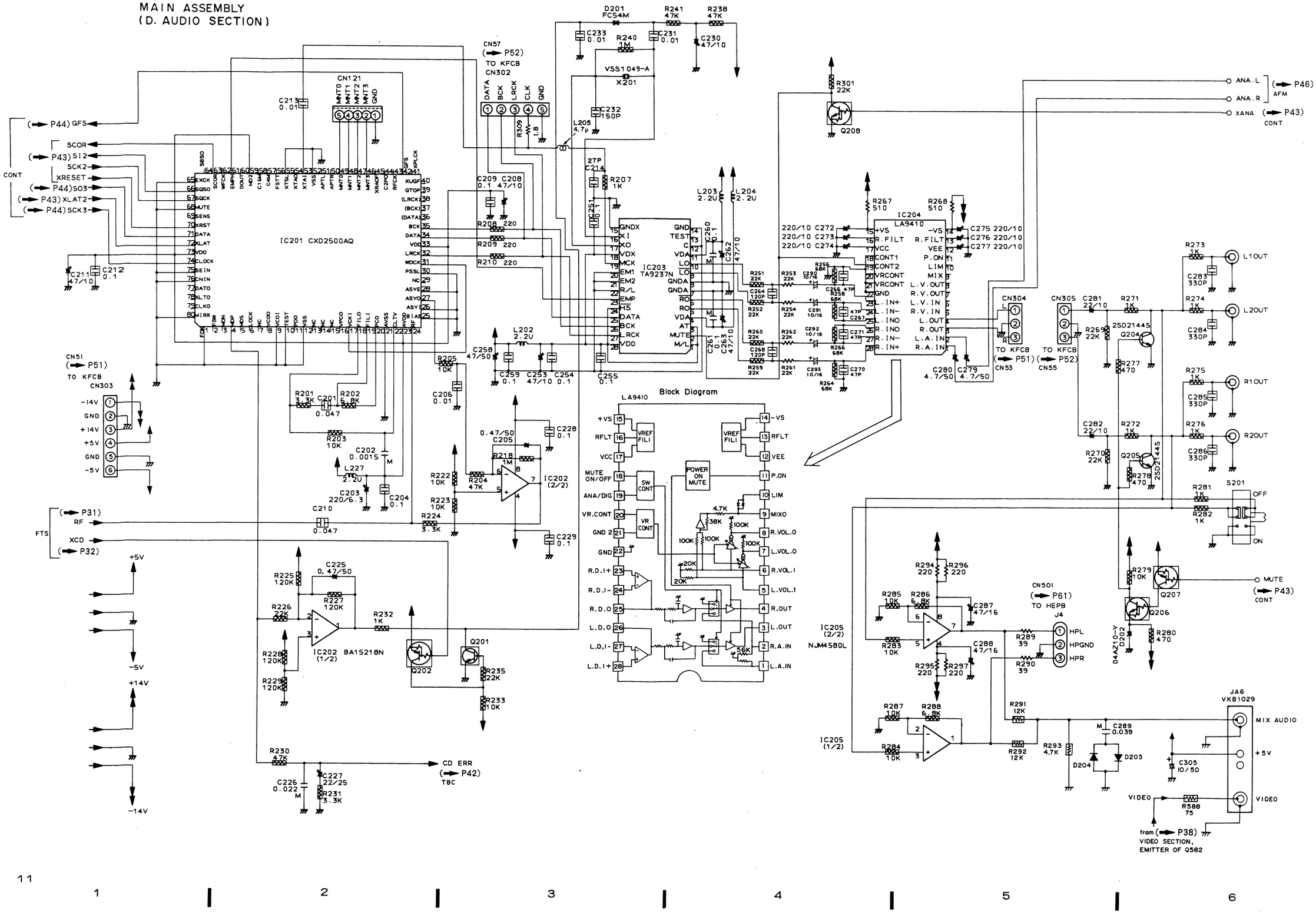
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N38. MFD. BY ROHM CO., LTD. FOR IC215.

CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. ICP-N50. MFD. BY ROHM CO., LTD. FOR IC213 AND IC214.

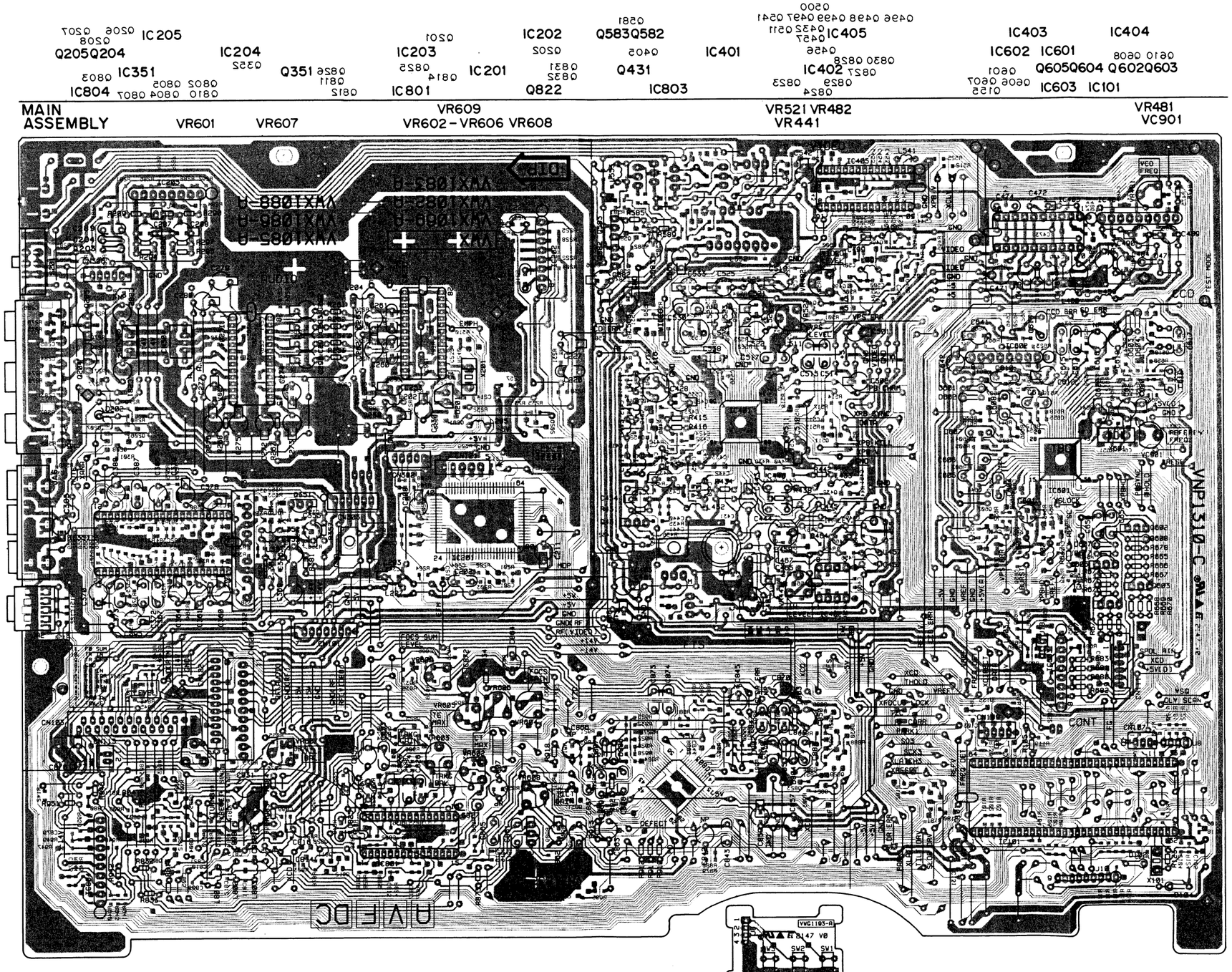
CAUTION : FOR CONTINUED PROTECTION AGAINST RISK OF FIRE. REPLACE WITH SAME TYPE NO. PT0.5A MFD. BY S. K. K., LTD. FOR F211 AND F212.

MAIN ASSEMBLY (D. AUDIO SECTION)

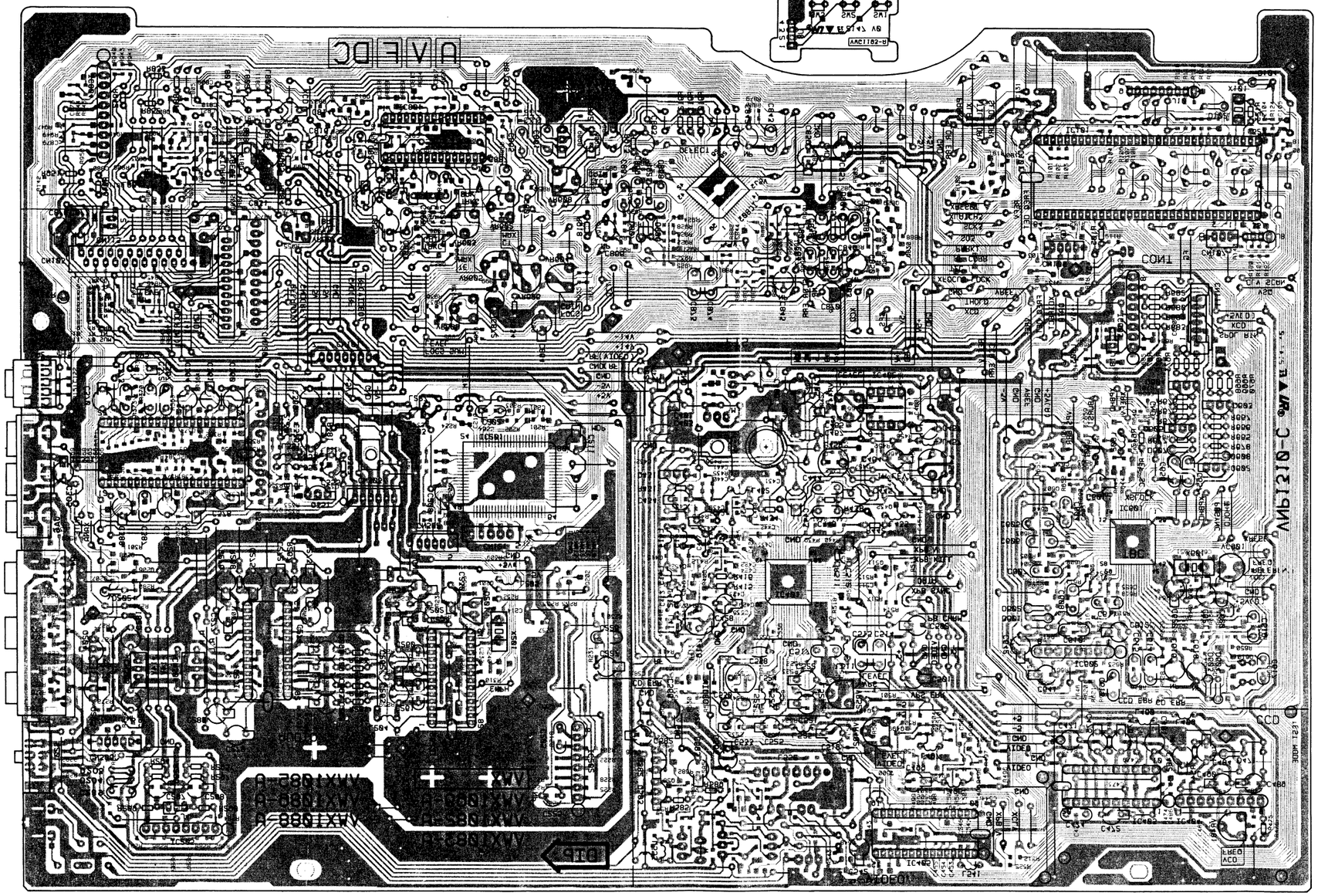
MAIN ASSEMBLY
(D. AUDIO SECTION)



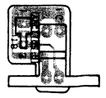
• View from component side



WS ASSEMBLY



FC ASSEMBLY



MAIN ASSEMBLY

IC01 IC02 IC03 IC04 IC05 IC06 IC07 IC08 IC09 IC10 IC11 IC12 IC13 IC14 IC15 IC16 IC17 IC18 IC19 IC20 IC21 IC22 IC23 IC24 IC25 IC26 IC27 IC28 IC29 IC30 IC31 IC32 IC33 IC34 IC35 IC36 IC37 IC38 IC39 IC40 IC41 IC42 IC43 IC44 IC45 IC46 IC47 IC48 IC49 IC50 IC51 IC52 IC53 IC54 IC55 IC56 IC57 IC58 IC59 IC60 IC61 IC62 IC63 IC64 IC65 IC66 IC67 IC68 IC69 IC70 IC71 IC72 IC73 IC74 IC75 IC76 IC77 IC78 IC79 IC80 IC81 IC82 IC83 IC84 IC85 IC86 IC87 IC88 IC89 IC90 IC91 IC92 IC93 IC94 IC95 IC96 IC97 IC98 IC99 IC100 IC101 IC102 IC103 IC104 IC105 IC106 IC107 IC108 IC109 IC110 IC111 IC112 IC113 IC114 IC115 IC116 IC117 IC118 IC119 IC120 IC121 IC122 IC123 IC124 IC125 IC126 IC127 IC128 IC129 IC130 IC131 IC132 IC133 IC134 IC135 IC136 IC137 IC138 IC139 IC140 IC141 IC142 IC143 IC144 IC145 IC146 IC147 IC148 IC149 IC150 IC151 IC152 IC153 IC154 IC155 IC156 IC157 IC158 IC159 IC160 IC161 IC162 IC163 IC164 IC165 IC166 IC167 IC168 IC169 IC170 IC171 IC172 IC173 IC174 IC175 IC176 IC177 IC178 IC179 IC180 IC181 IC182 IC183 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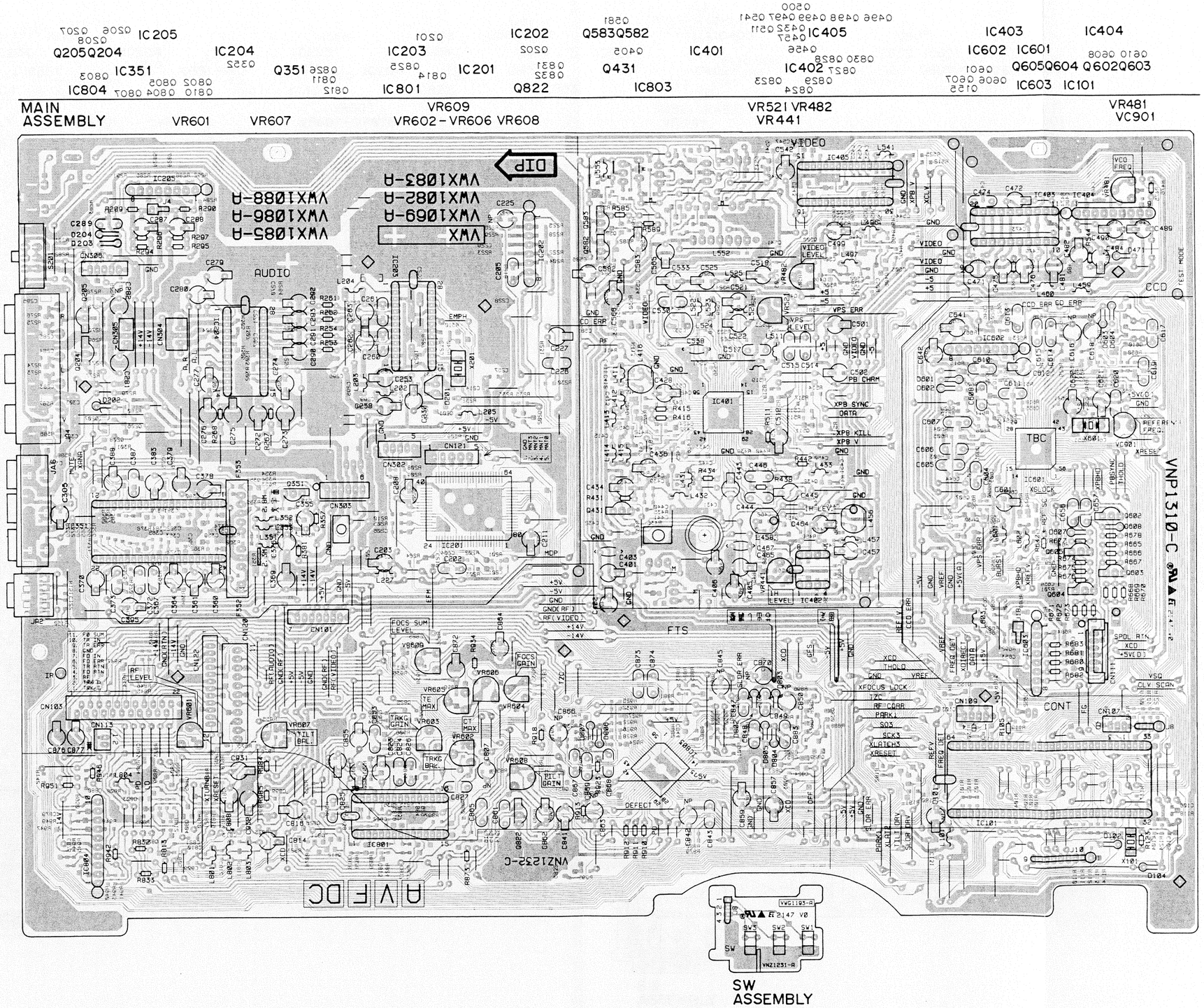
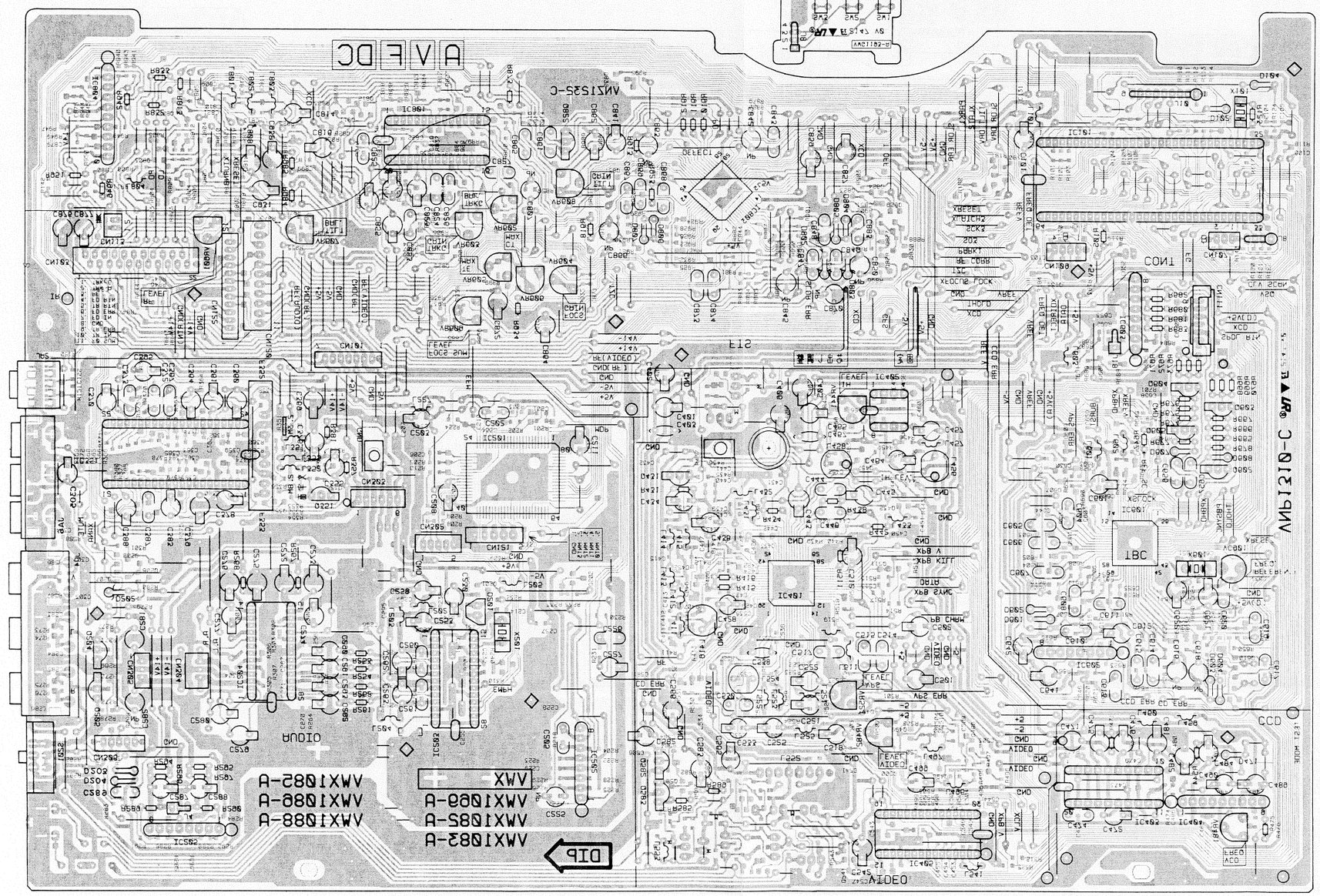
• View from soldering side

• View from component side



• View from soldering side

ASSEMBLY
WS



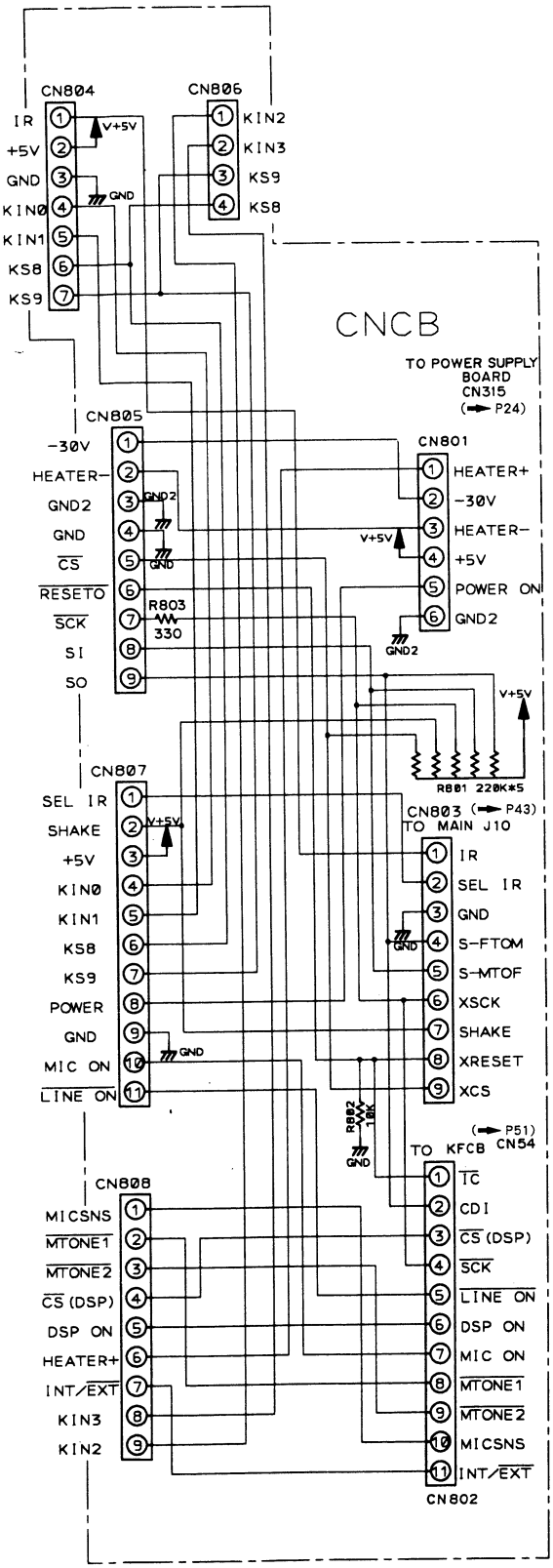
ASSEMBLY
FC

MAIN

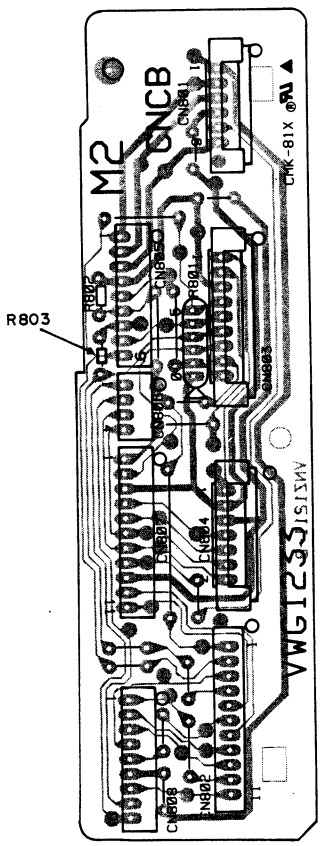
| | | |

SERVICE INFORMATION FOR CNCB ASSEMBLY

- **The CNCB assembly of CLD–V820/KUC is the same as that of CLD–2590K/R.**
- **R803 (RD1/6PM331J) is an addition to CNCB assembly for CLD–V820/KUC and CLD–2590K/R.**

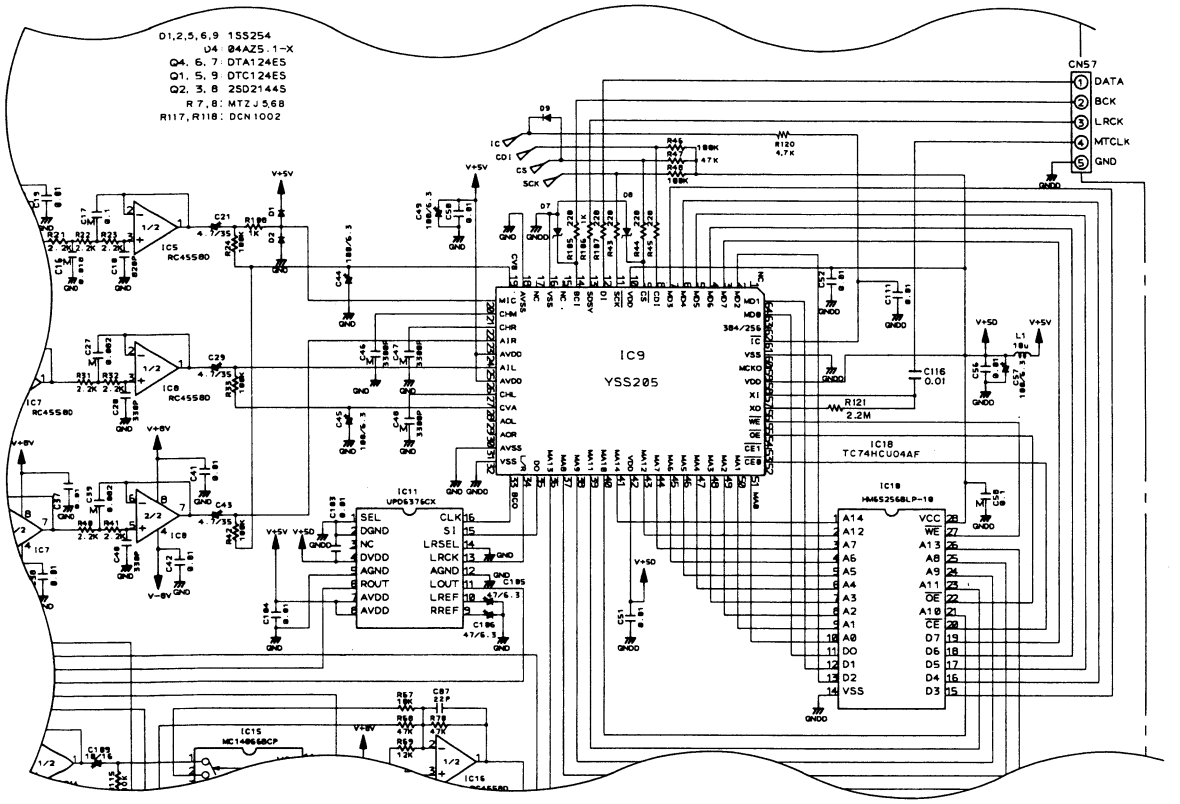


- **View from component side**

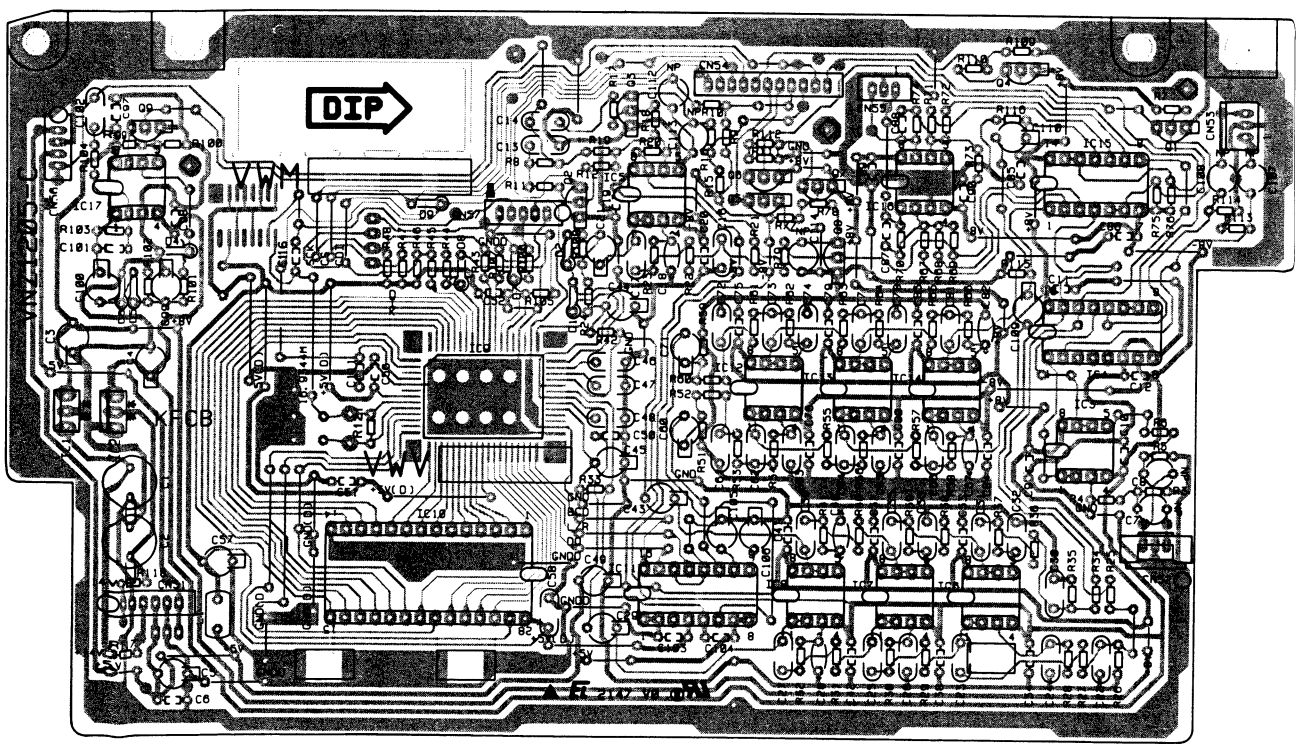


SERVICE INFORMATION FOR KFCB ASSEMBLY

- **The KFCB assembly of CLD–V820 is the same as that of CLD–2590K/R.**
- **R121 (RD1/6PM225J) and C116 (CKPUYY103N16) are addition to KFCB assembly and IC18 (TC74HCU04AF) and C115 (CKPUYY103N16) are delection from KFCB assembly for CLD–V820/KUC and CLD–2590K/R.**

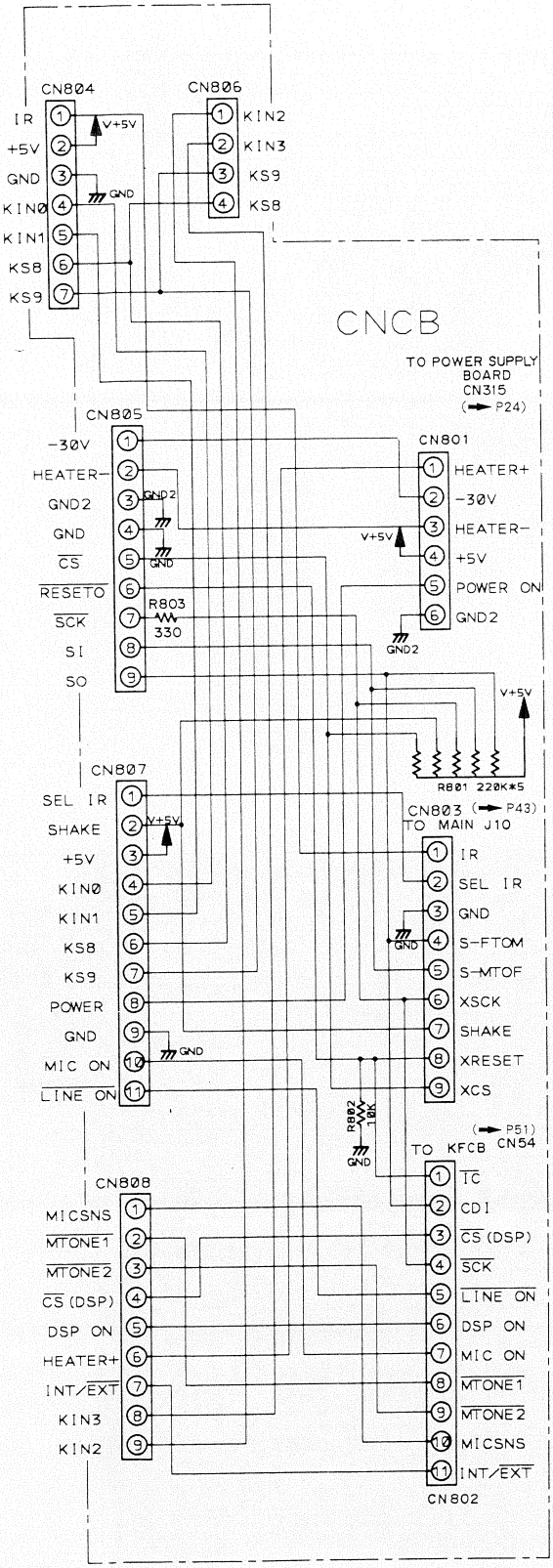


- **View from component side**

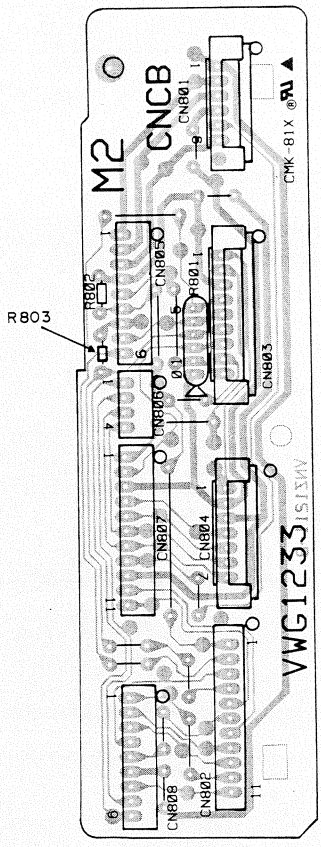


SERVICE INFORMATION FOR CNCB ASSEMBLY

- **The CNCB assembly of CLD–V820/KUC is the same as that of CLD–2590K/R.**
- **R803 (RD1/6PM331J) is an addition to CNCB assembly for CLD–V820/KUC and CLD–2590K/R.**

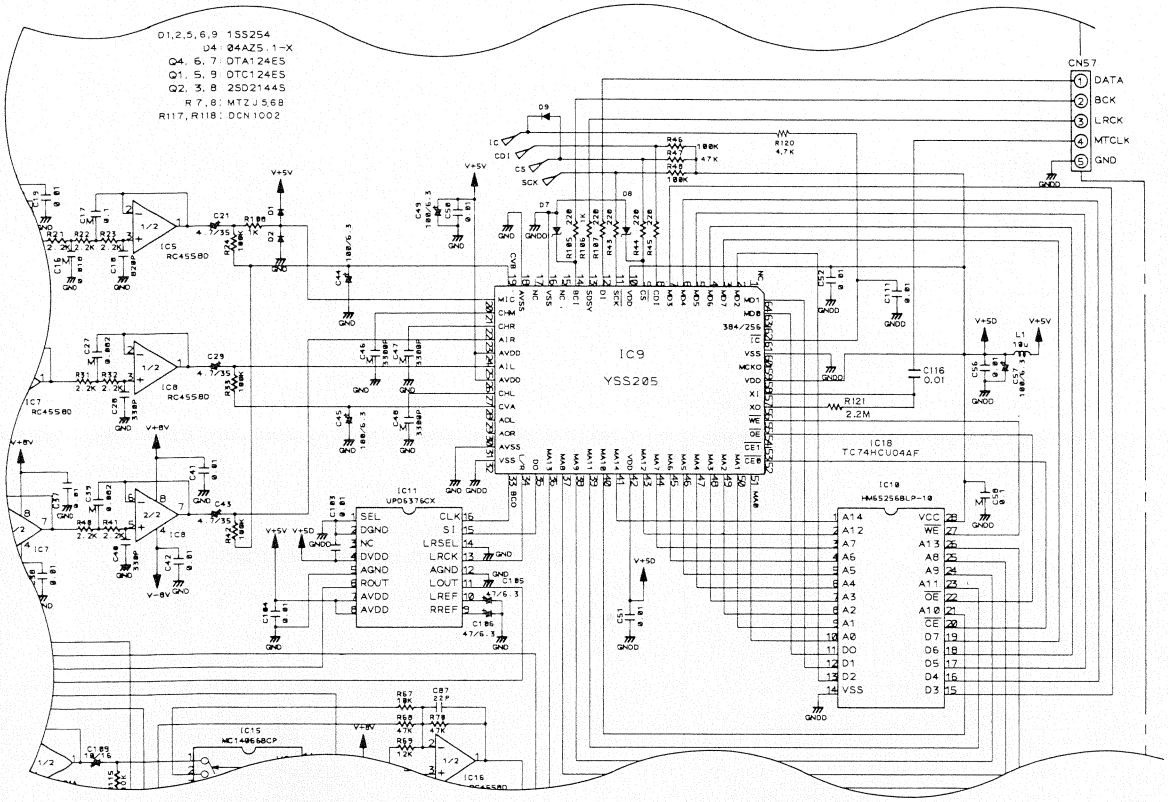


- View from component side

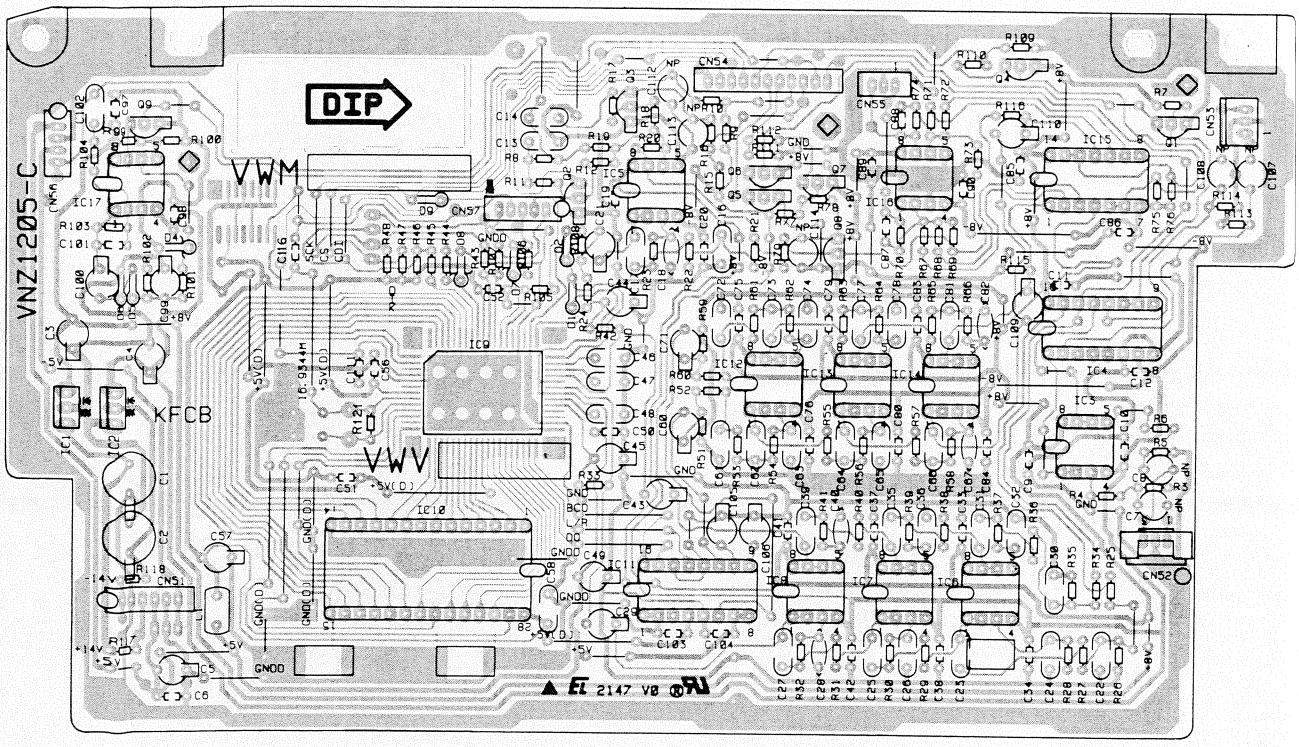


SERVICE INFORMATION FOR KFCB ASSEMBLY

- **The KFCB assembly of CLD–V820 is the same as that of CLD–2590K/R.**
- **R121 (RD1/6PM225J) and C116 (CKPUYY103N16) are addition to KFCB assembly and IC18 (TC74HCU04AF) and C115 (CKPUYY103N16) are delection from KFCB assembly for CLD–V820/KUC and CLD–2590K/R.**



- View from component side



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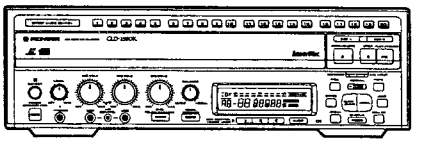
Service Manual



ORDER NO.
ARP2316

CD CDV LD PLAYER

CLD-2590K

● **This manual is applicable to the R type.**

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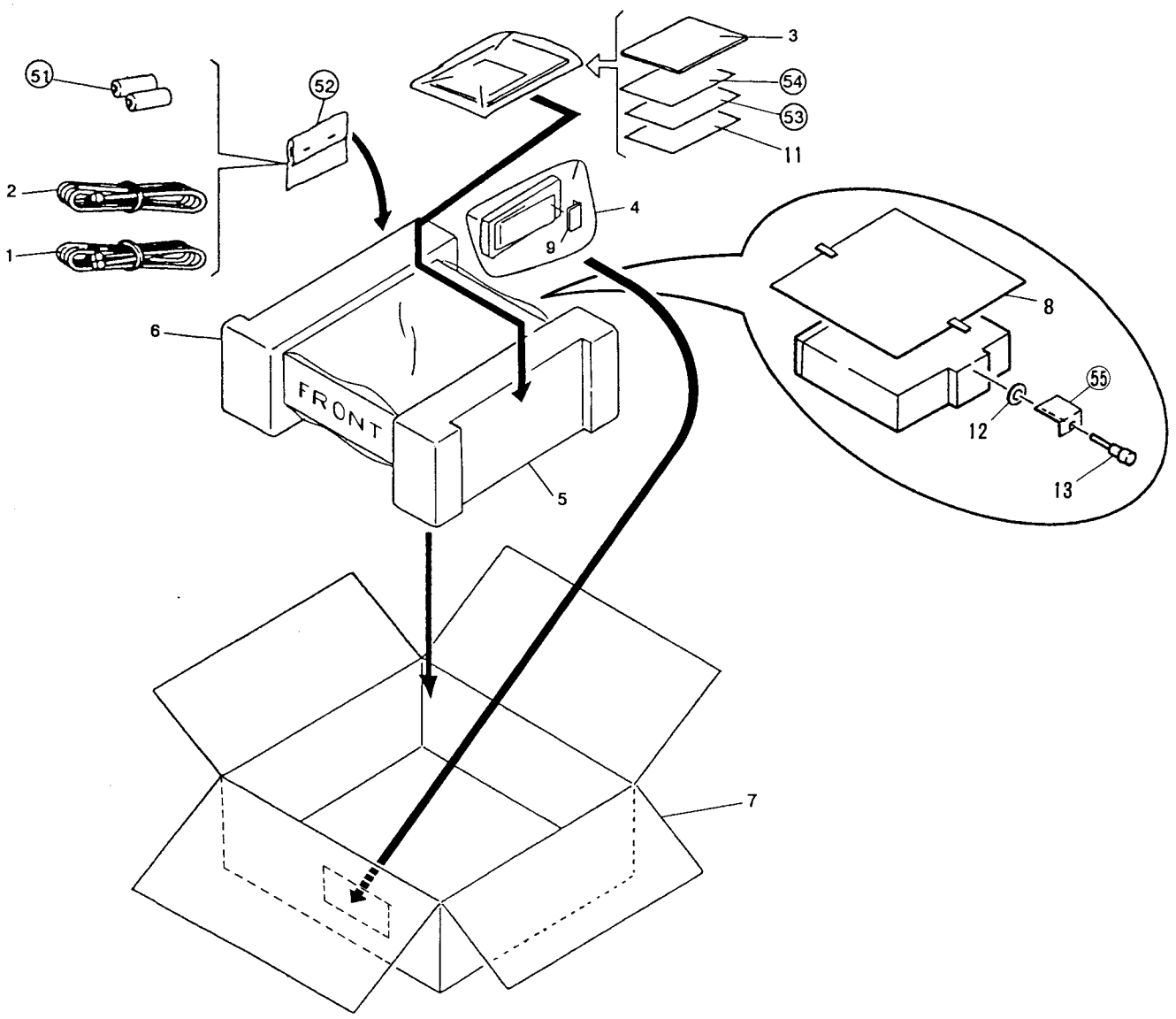
1. PACKING

Parts List

Mark	No.	Description	Part No.
	1	Connection cord	VDE – 055
	2	Video cable	VDE – 056
	3	Operating instructions (English)	VRB1062
	4	Remote control unit (CU – CLD047)	VXX1604
	5	Pad (R)	VHA1083
	6	Pad (L)	VHA1082
	7	Packing case	VHG1187
	8	Mirror mat	VHL1012
	9	Battery cover	VNK1293
	10	·····	
	11	Operating instructions	VRK1002
	12	Washer	WT36D072D025
	13	Screw	VLL1358

Mark	No.	Description	Part No.
	51	Dry cell battery (R03, AAA)	VEM – 022
	52	Vinyl bag	VHL – 014
	53	Caution card	VRR1009
	54	Caution card (UC)	VRM1026
	55	Tac card	VRW1200



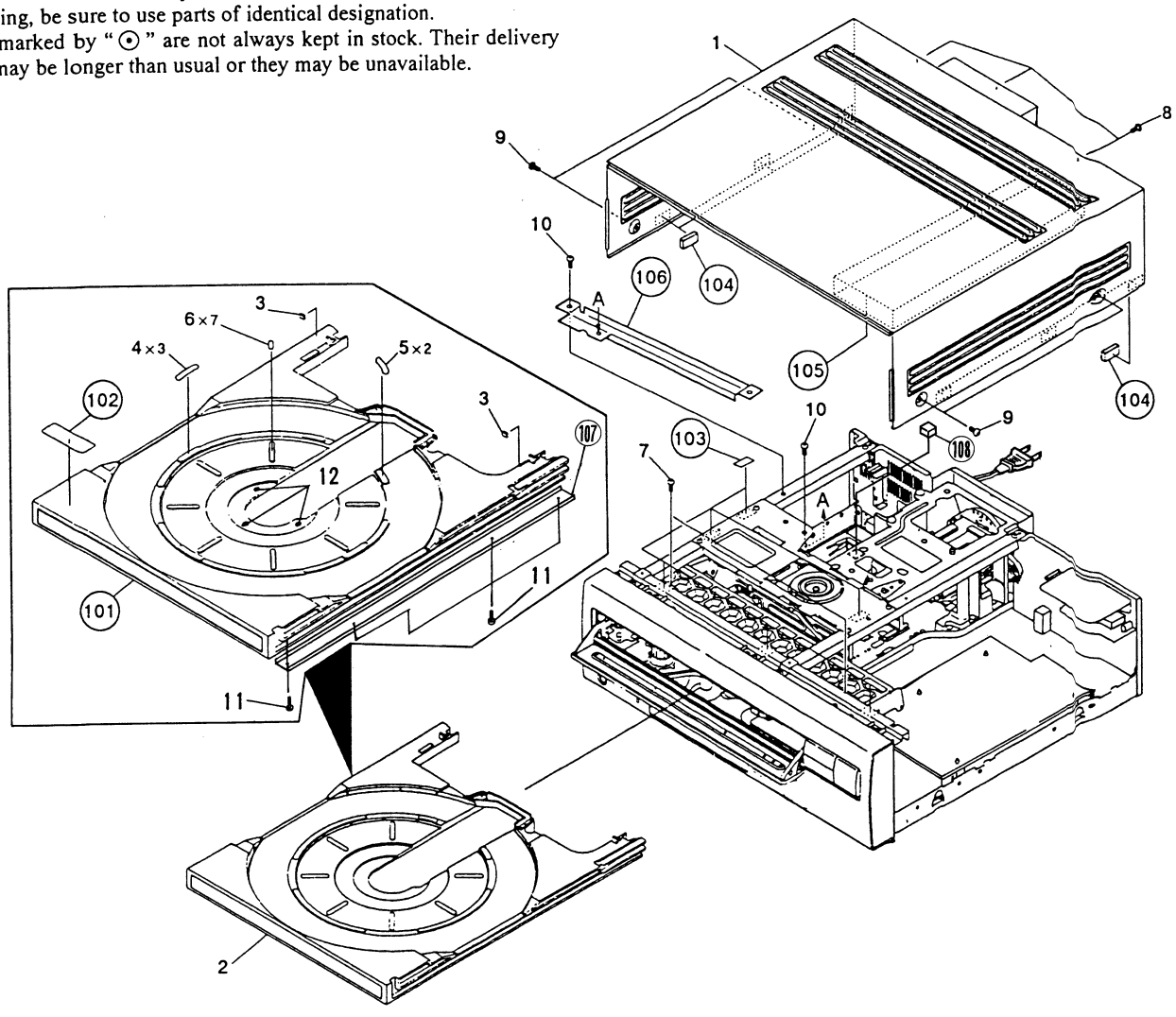
2. EXPLODED VIEWS AND PARTS LIST

2.1 EXTERIOR SECTION

Mark	No.	Description	Part No.
	1	Bonnet – S	VXX1535
	2	Tray assembly – S	VXX1534
	3	Tray rubber	VEB1089
	4	Disc pad (L)	VEC1191
	5	Disc pad (B)	VEC1379
	6	Disc pad (C)	VEC1380
	7	Screw	VCZ30P120FMC
	8	Screw	BBT30P060FCC
	9	Screw	BCZ40P060FZK
	10	Screw	IBZ30P060FCC
	11	Screw	BPZ30P080FCU
	12	CD pad	VEC1252

Mark	No.	Description	Part No.
	101	Tray	VNK1672
	102	Carry label	VRW1058
	103	Cushion	VEC1092
	104	Cushion	VEC1004
	105	Cushion	VEC1104
	106	Reinforced plate angle	VNE1673
	107	Reinforced plate	VNE1679
	108	Cushion	VEC1493

- The parts with an encircled number are generally unavailable because they are not in our Master Spare Parts List.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

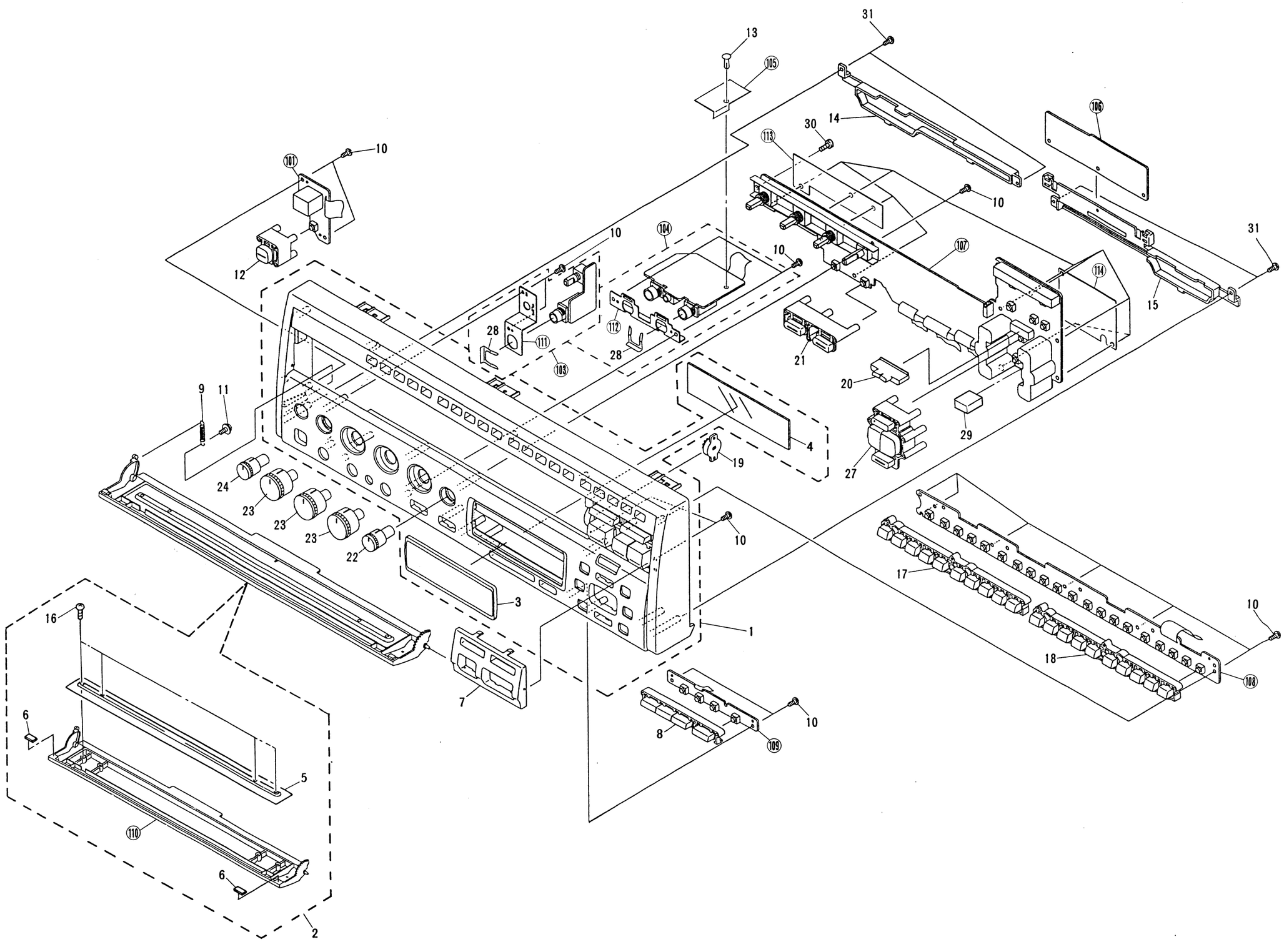


2.2 FRONT PANEL SECTION

Parts List

Mark	No.	Description	Part No.
	1	Front panel assembly – S	VXX1634
	2	Front door assembly – S	VXX1637
	3	FL panel	VNK1854
	4	FL filter	VNK1855
	5	Door plate	VNE1482
	6	Door dump rubber	VEB1141
	7	Sub panel	VNK1863
	8	Key control button	VNK1859
	9	Door spring	VBH1140
	10	Screw	BPZ26P060FCU
	11	Screw	IPZ26P060FMC
	12	PW button	VNK1856
	13	Plastic rivet	VEC – 143
	14	Back panel (L)	VNK1864
	15	Back panel (R)	VNK1865
	16	Screw	BPZ20P040FZK
	17	Ten key (A)	VNK1860
	18	Ten key (B)	VNK1861
	19	Dumper assembly	VXA1053
	20	Change knob	VNK1862
	21	Vocal button assembly	VXA1694
	22	VOL knob (S)	VNK1857
	23	VOL knob (L)	VNK1858
	24	HP knob	VNK1920
	25	.....	
	26	.....	
	27	Select button assembly	VXA1773
	28	Snap plate	VNE1102
	29	LED spacer	VEB1173
	30	Screw	BPZ26P060FCU
	31	Screw	BPZ26P080FMC
	101	IRKB assembly	VWG1282
	102	.....	
	103	HEPB assembly	VWV1205
	104	MIJB assembly	VWV1231
	105	Insulation sheet	VEC1465
	106	CNCB assembly	VWG1233
	107	FLKB assembly	VWG1284
	108	DIKB assembly	VWG1234
	109	KCKB assembly	VWG1232
	110	Front door assembly	VXA1695
	111	Jack holder (S)	VNE1643
	112	Jack holder (L)	VNE1644
	113	Shield sheet	VEF1037
	114	Insulation sheet B	VEC1499

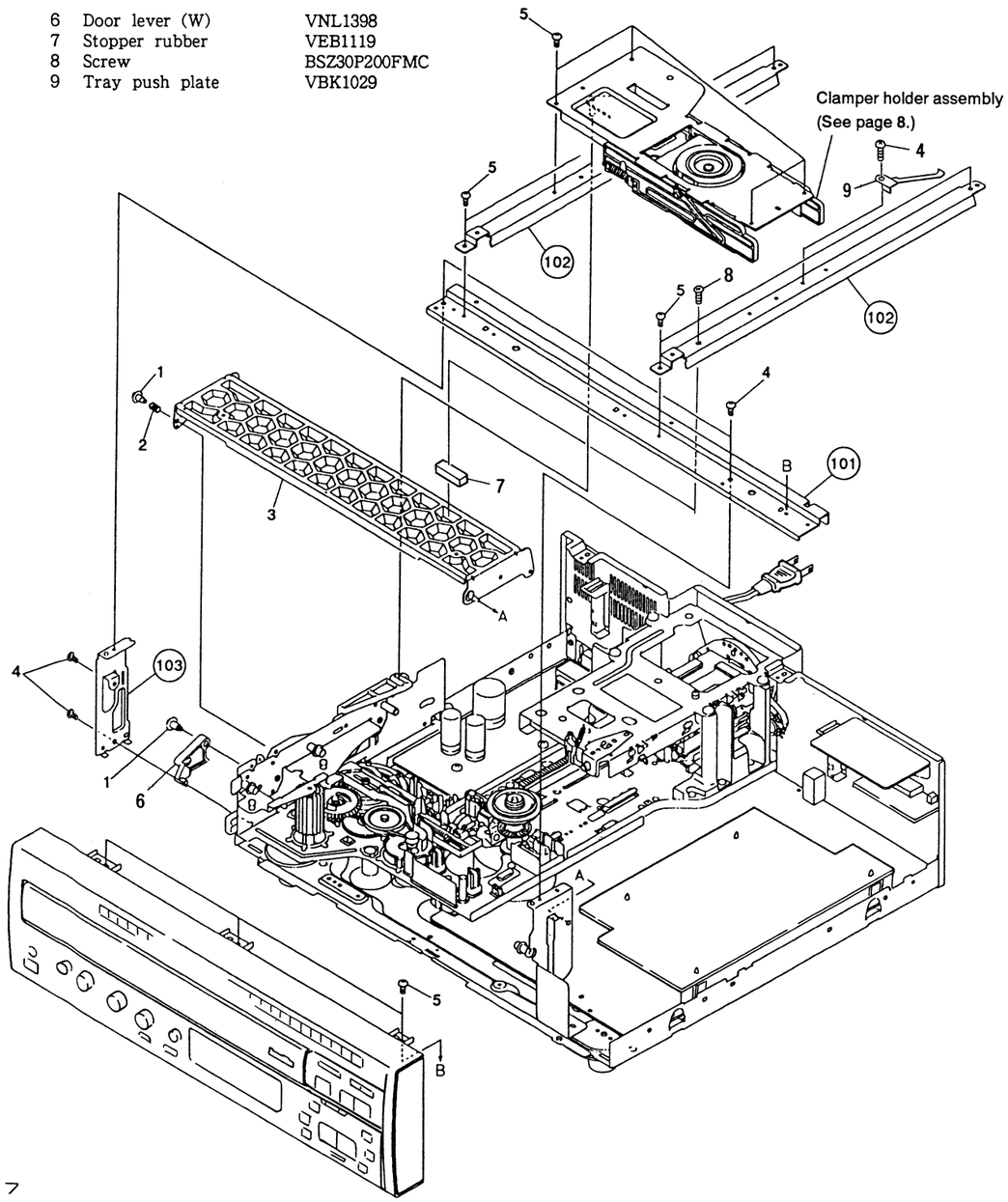
FRONT PANEL SECTION



2.3 TOP VIEW SECTION

Parts List

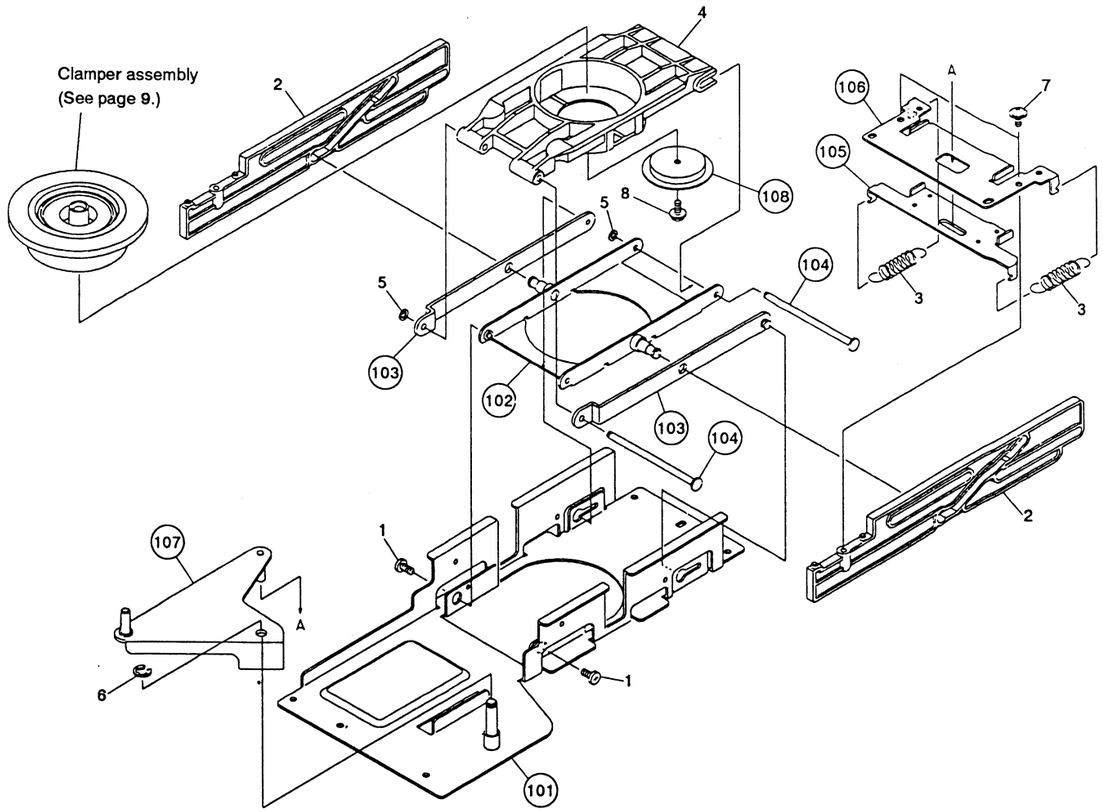
Mark	No.	Description	Part No.
	1	Screw (B)	VBA1008
	2	Arm spring	VBH1093
	3	Tray guide assembly	VXA1576
	4	Screw	BBZ30P060FCC
	5	Screw	IBZ30P060FCC
	6	Door lever (W)	VNL1398
	7	Stopper rubber	VEB1119
	8	Screw	BSZ30P200FMC
	9	Tray push plate	VBK1029
	101	Front angle	VNE1543
	102	Center angle	VNE1678
	103	Side stay (L)	VNE1545



2.4 CLAMPER SECTION

Parts List

Mark	No.	Description	Part No.
	1	Pivot screw	VBA1022
	2	Clamp cam	VNL1306
	3	Limiter spring	VBH1168
	4	Clamper holder	VNL1305
	5	Washer	WT26D060D050
	6	E ring	YE40FUC
	7	Screw	IPZ30P060FMC
	8	Screw	IMZ30P060FMC
	101	Center plate assembly	VXA1506
	102	Lever (B) assembly	VXA1504
	103	Lever (A) assembly	VXA1503
	104	Clamp shaft	VLL1299
	105	Limiter plate	VNE1551
	106	Slide plate	VNE1551
	107	Lever (C) assembly	VXA1505
	108	Clamper head	VNE1546

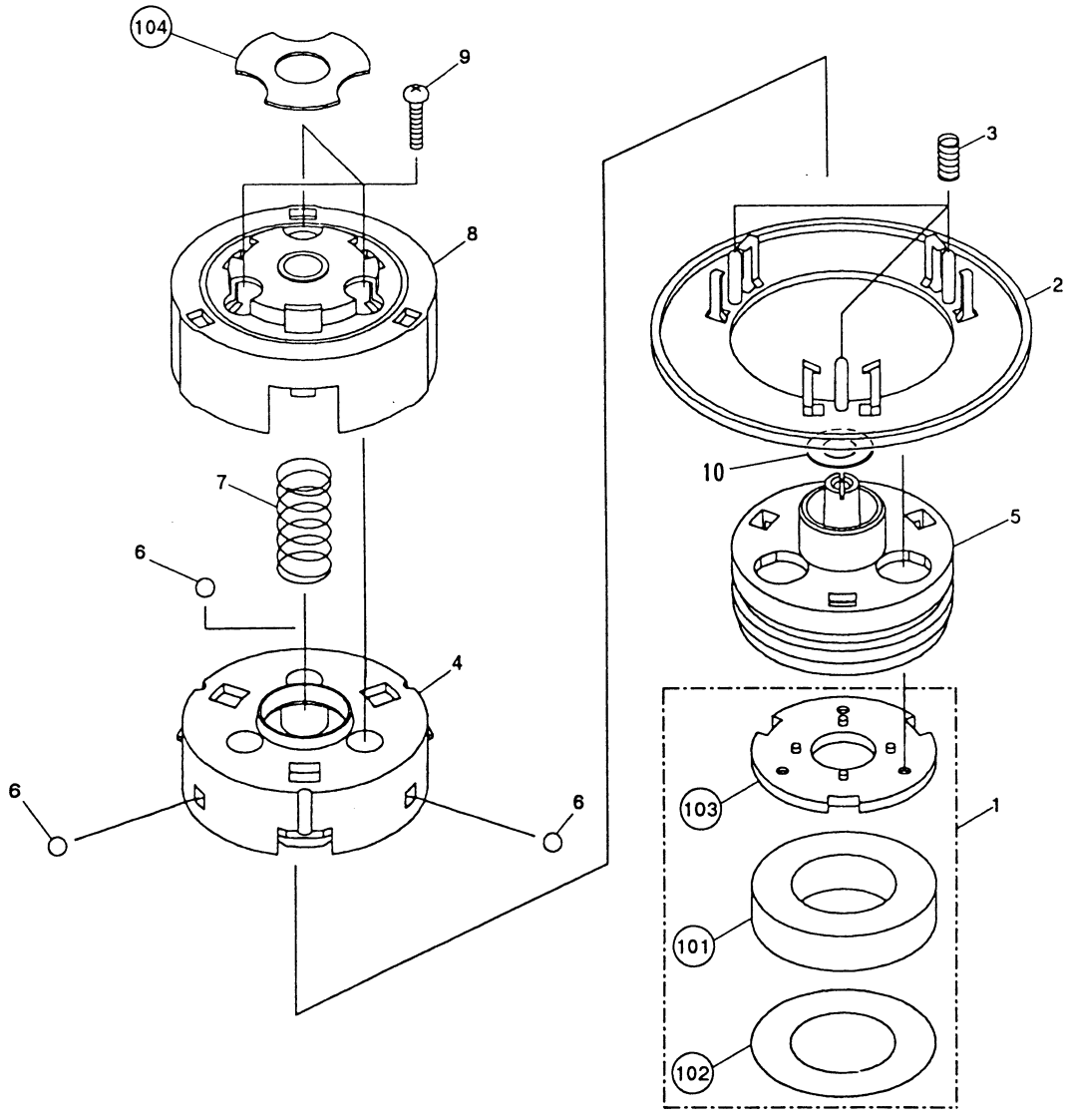


2.5 CLAMPER ASSEMBLY

Parts List

Mark	No.	Description	Part No.
	1	Magnet assembly – S	VXX1475
	2	Disc clamper	VNL1362
	3	Clamper spring	VBH1153
	4	Clamper base	VNL1364
	5	Centering hub (B)	VNL1435
	6	Steel ball	VNX1006
	7	Centering spring (B)	VBH1130
	8	Clamper cover	VNL1363
	9	Screw	AMZ20P040FMC
	10	Washer	WA60F115M160

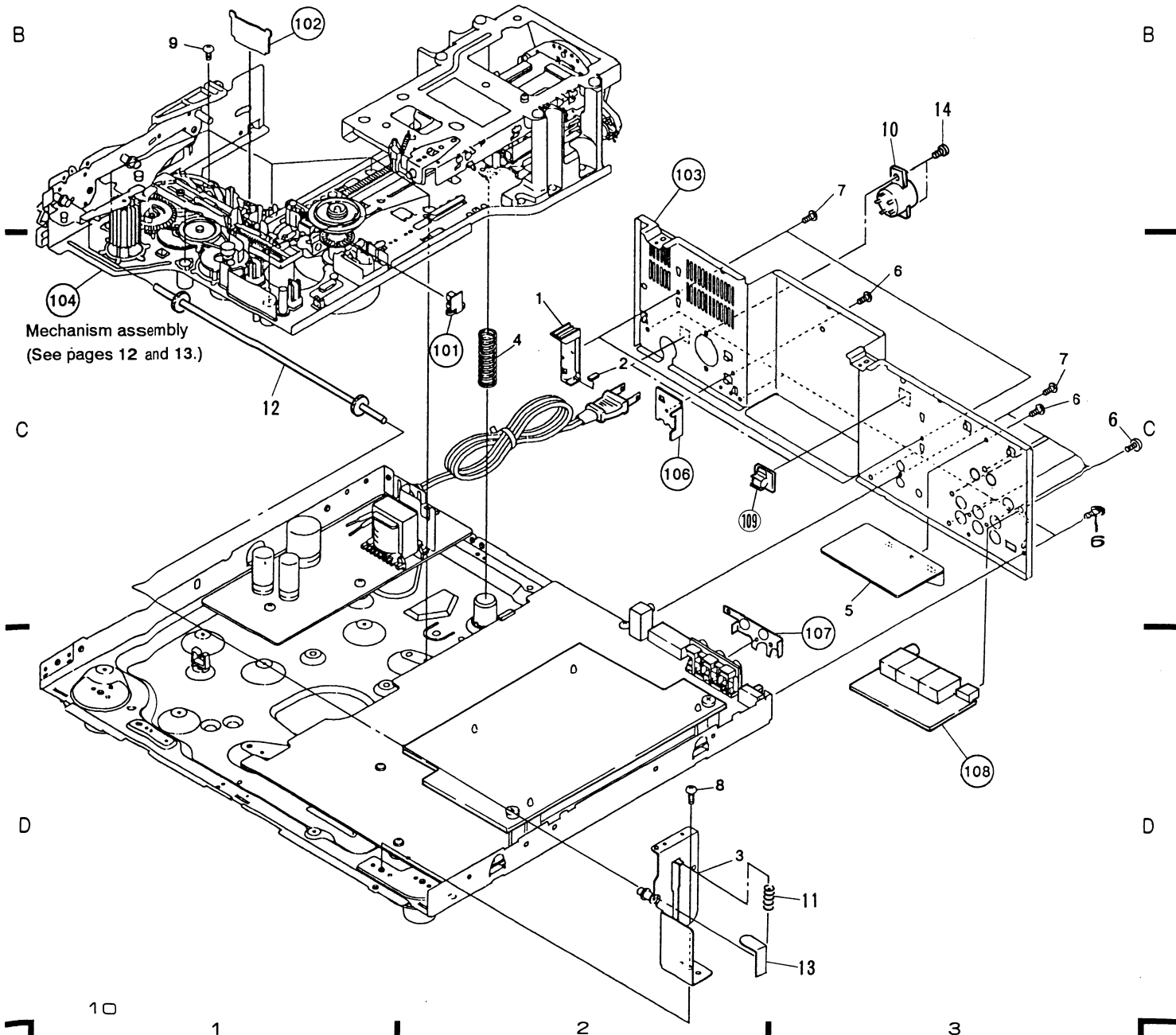
Mark	No.	Description	Part No.
	101	Magnet	VMG1010
	102	Gap sheet	VEC1058
	103	Clamper plate	VNE1549
	104	Absorber rubber (A)	VEB1146



2.6 BASE SECTION (1)

Parts List

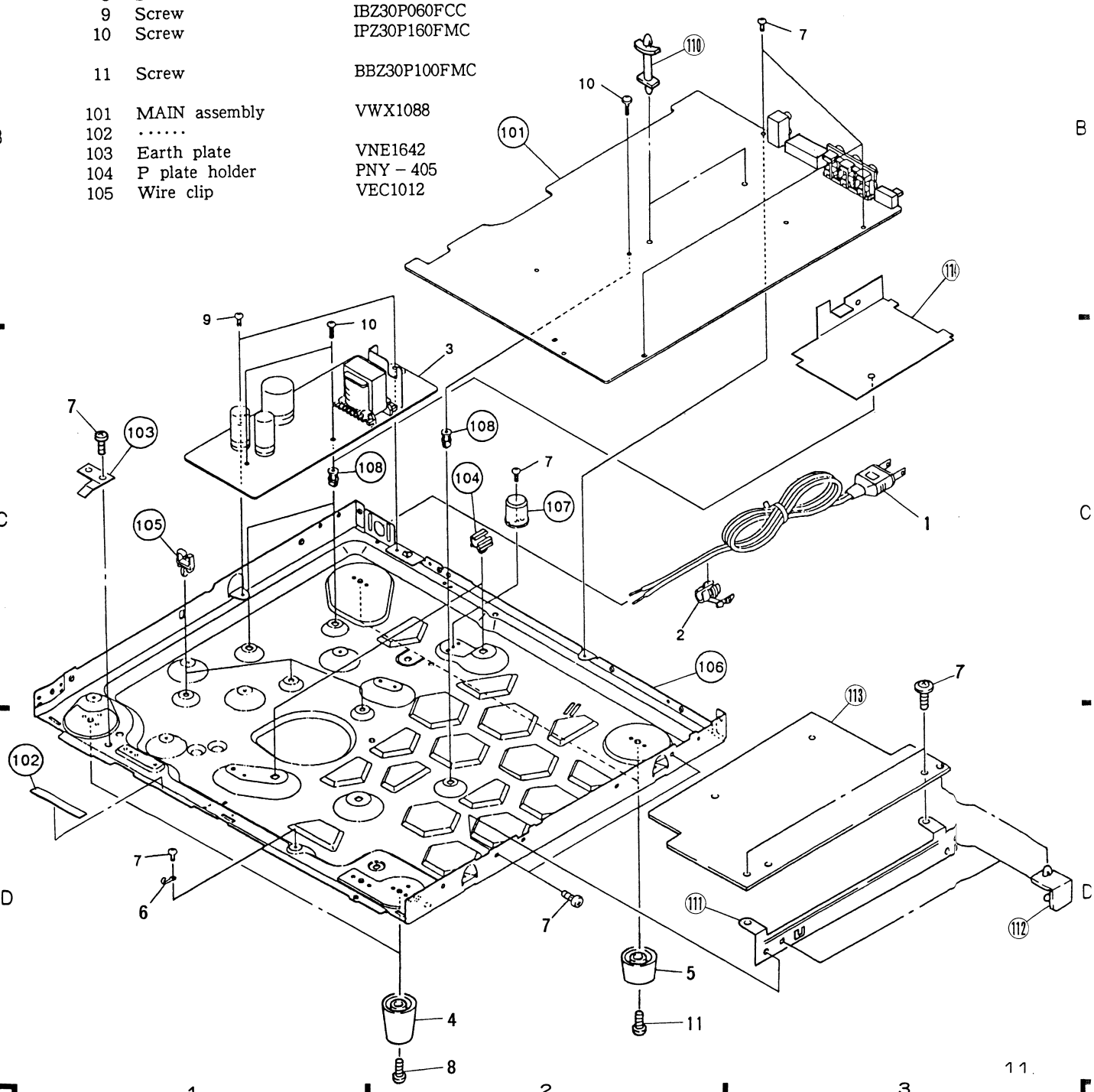
Mark	No.	Description	Part No.
	1	Tray stopper	VNL1202
	2	Door dump rubber	VEB1033
	3	Side stay (R) assembly	VXA1690
	4	Base spring	VBH1145
	5	DRVB assembly	VWS1087
	6	Screw	BBT30P060FCC
	7	Screw	BPZ30P080FCU
	8	Screw	BBZ30P060FCC
	9	Screw (B)	VBA1023
	10	Voltage selector	VSB1005
	11	Synchro spring	VBH1139
	12	Synchro gear assembly	VXA1627
	13	Synchro holder	VNL1334
	14	Screw	BBZ30P080FCC
	101	FG assembly	VWG1192
	102	SW assembly	VWG1193
	103	Rear panel	VNA1228
	104	Mechanism assembly	VWT1074
	105	.....	
	106	TB holder	VNE1612
	107	6P earth plate	VNE1674
	108	EXTB assembly	VWG1229
	109	Wire clamp	VEC1237



2.7 BASE SECTION (2)

Parts List

Mark	No.	Description	Part No.
⚠	1	AC power cord	VDG1034
⚠	2	Strain relief	CM – 22
	3	Power supply board assembly	VWR1109
	4	Insulator assembly	VXA1660
	5	Insurator assembly	VXA1661
	6	Code holder	VNF – 069
	7	Screw	BBZ30P060FCC
	8	Screw	BBZ30P180FMC
	9	Screw	IBZ30P060FCC
	10	Screw	IPZ30P160FMC
	11	Screw	BBZ30P100FMC
	101	MAIN assembly	VWX1088
	102	·····	
	103	Earth plate	VNE1642
	104	P plate holder	PNY – 405
	105	Wire clip	VEC1012
	106	Base chassis	VNA1226
	107	Spring guide	VNL1343
	108	PCB spacer	PNY – 404
	109	·····	
	110	PC support	VEC1282
	111	PCB holder (A)	VNE1394
	112	PCB hinge	VEC – 159
	113	KFCB assembly	VWV1230
	114	Power insulator sheet	VEC1492

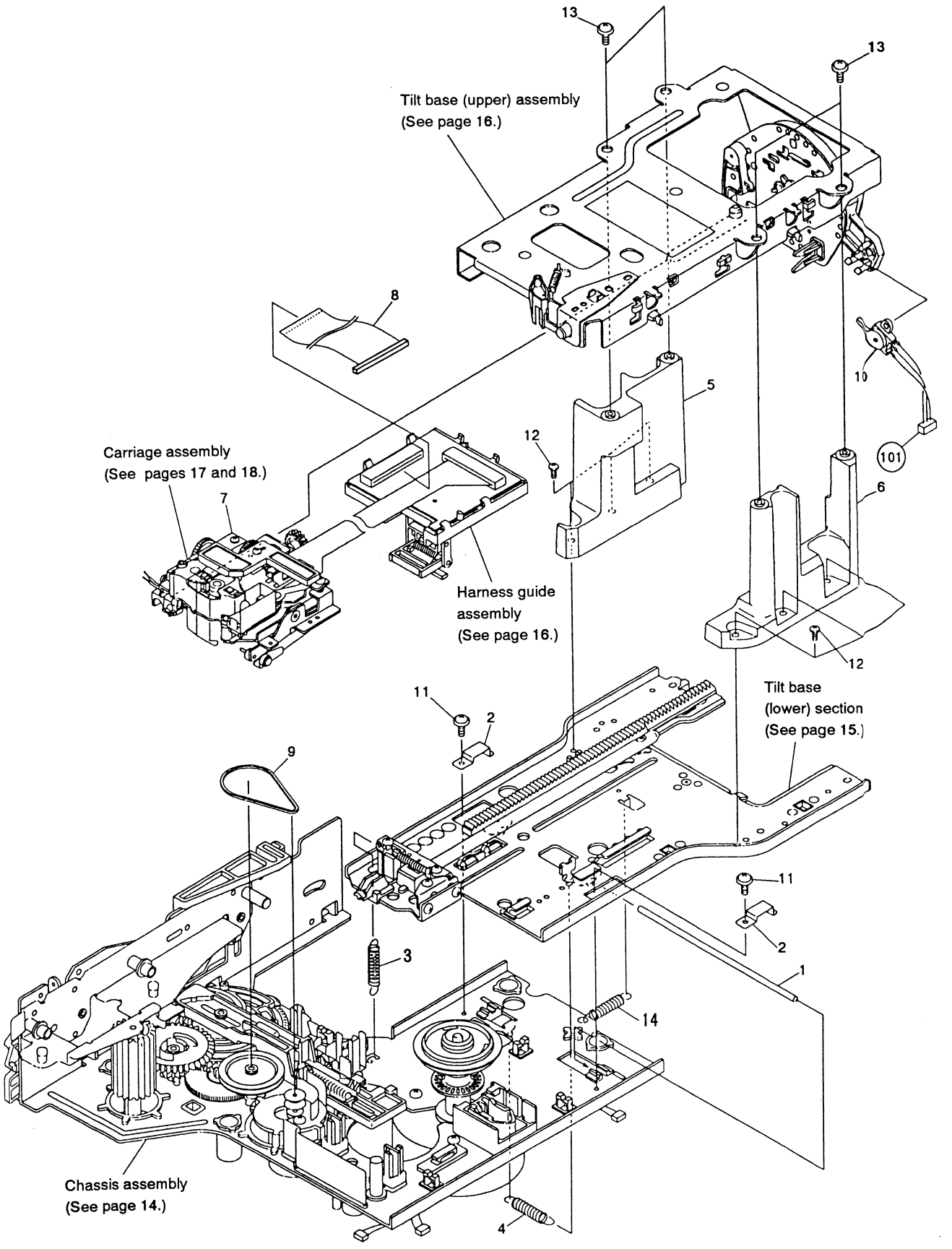


2.8 MECHANISM ASSEMBLY

Parts List

Mark	No.	Description	Part No.
	1	Tilt shaft	VLL1326
	2	Plate spring	VBK1013
	3	Tilt spring	VBH1146
	4	Thrust spring	VBH1163
	5	Post (L)	VNL1347
	6	Post (R)	VNL1348
⊙	7	Carriage assembly	VWT1068
	8	Flexible cable (22P)	VDA1329
	9	Belt	PEB1013
	10	Lever switch (TURN SW)	DSK1003
	11	Screw	ABZ26P050FMC
	12	Screw	IBZ30P100FMC
	13	Screw	IPZ30P100FCU
	14	Radial spring	VBH1164
	101	Housing assembly (3P)	VKP1856

MECHANISM ASSEMBLY

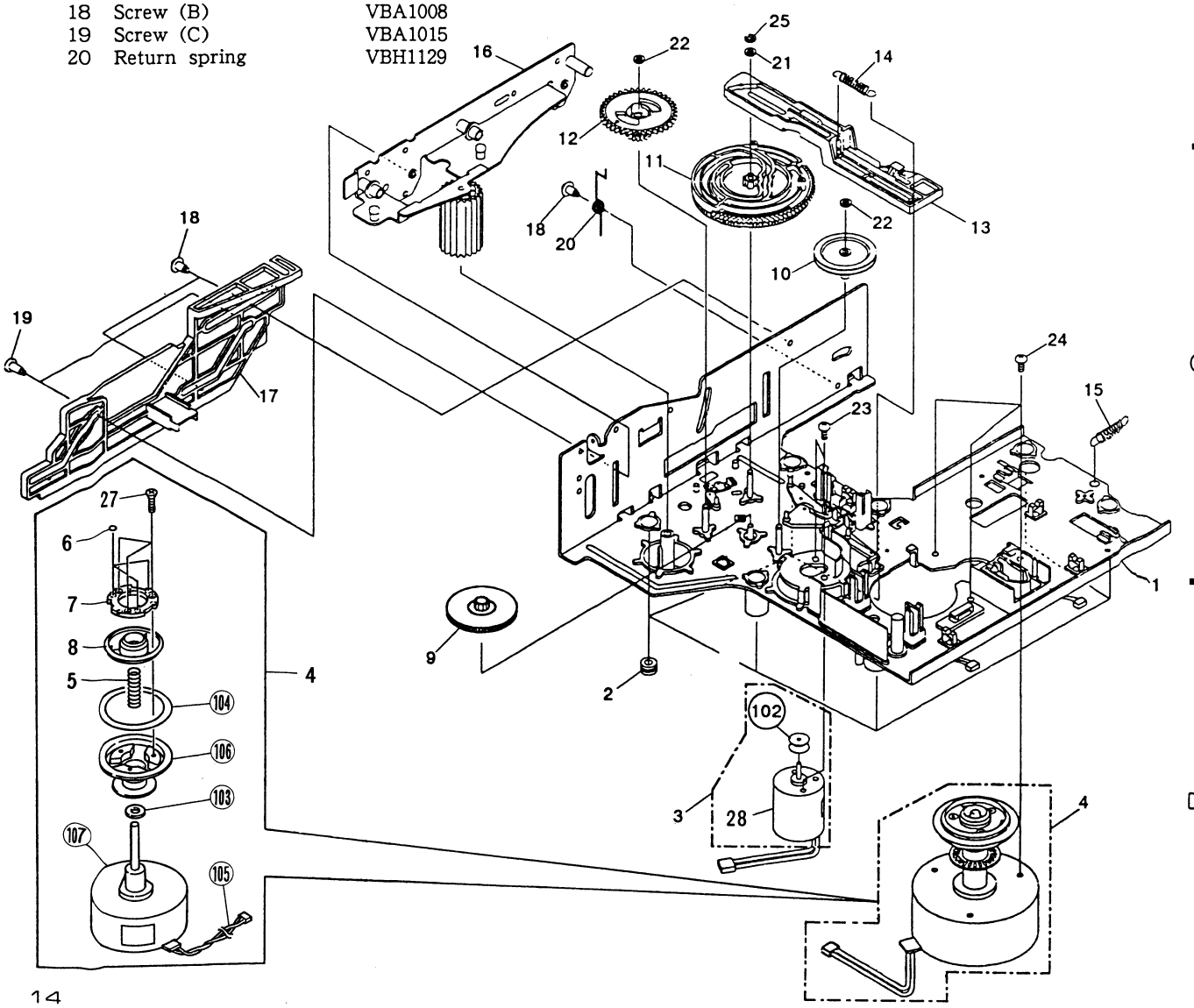


2.9 MECHANISM CHASSIS SECTION

Parts List

Mark	No.	Description	Part No.
⊙	1	Chassis assembly	VXA1577
	2	Rubber bushing	VEB1138
	3	Loading motor assembly	VXX1262
	4	Spindle motor assembly	VXA1761
	5	Centering spring	VBH1024
	6	Sheet	VEC1510
	7	Yoke plate A	VNE1360
	8	Centering hub (A)	VNL1296
	9	Two stair gear	VNL1326
	10	Gear pulley	VNL1249
	11	Cam gear	VNL1350
	12	Follow gear	VNL1317
	13	Spring slanting cam	VNL1316
	14	Cam spring	VBH1082
	15	Radial spring	VBH1164
	16	Roller plate assembly	VXA1770
	17	Slide cam	VNL1304
	18	Screw (B)	VBA1008
	19	Screw (C)	VBA1015
	20	Return spring	VBH1129

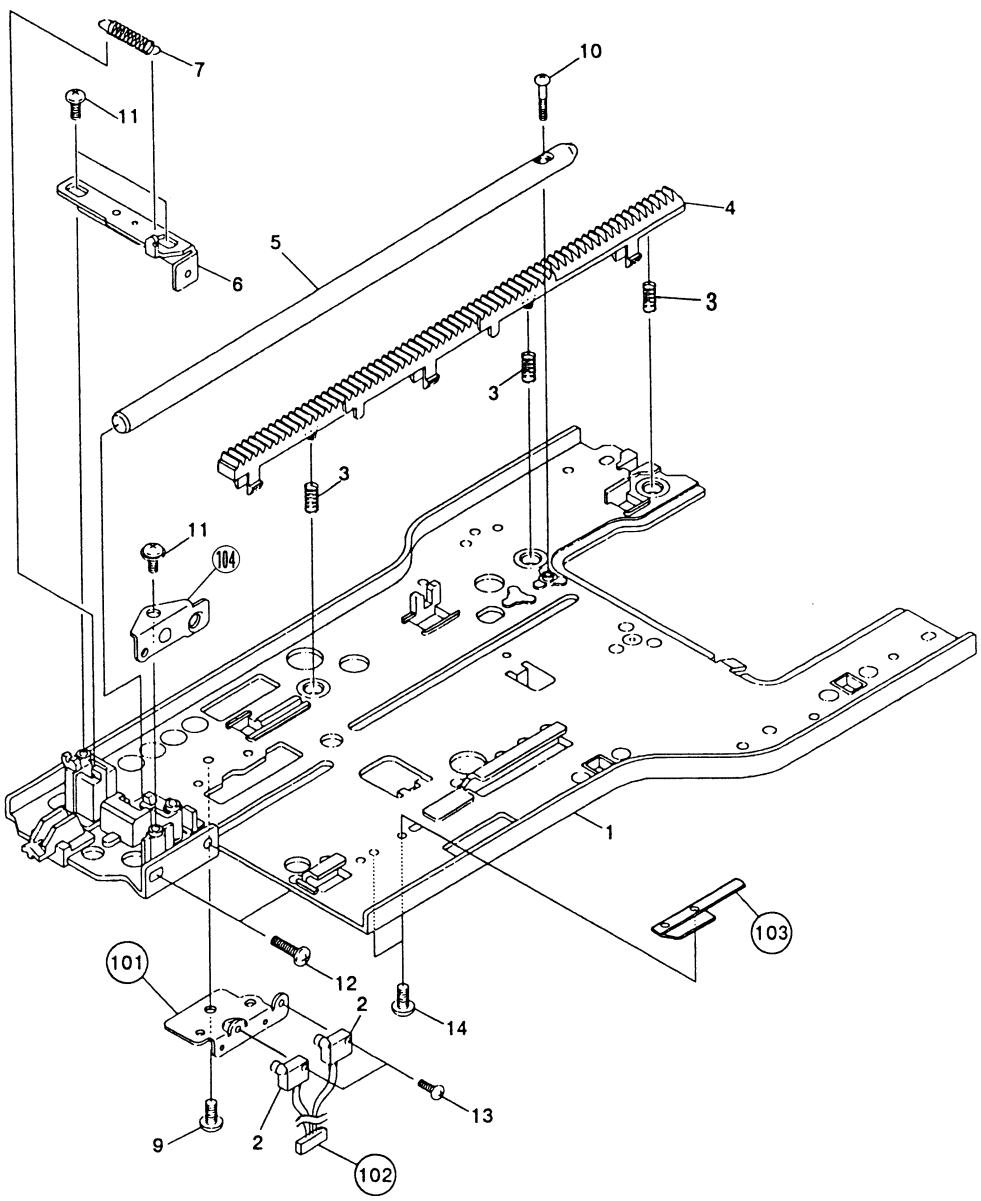
Mark	No.	Description	Part No.
	21	Nylon washer	WA32N080W050
	22	Washer	WT26D047D025
	23	Screw	PMZ30P040FCU
	24	Screw	PMA30P050FCU
	25	E ring 2, 3	YE23FUC
	26	.....	
	27	Screw	CPZ20P080FMC
	28	Loading motor	VXM1034
	101	.....	
	102	Motor pulley	VLL1176
	103	Oil stopped washer	VBF1002
	104	Rubber sheet	VEB1135
	105	Housing assembly	VKP1566
	106	Turn table assembly	VXA1760
	107	Spindle motor	VXM1046



2.10 TILT BASE (LOWER) SECTION

Parts List

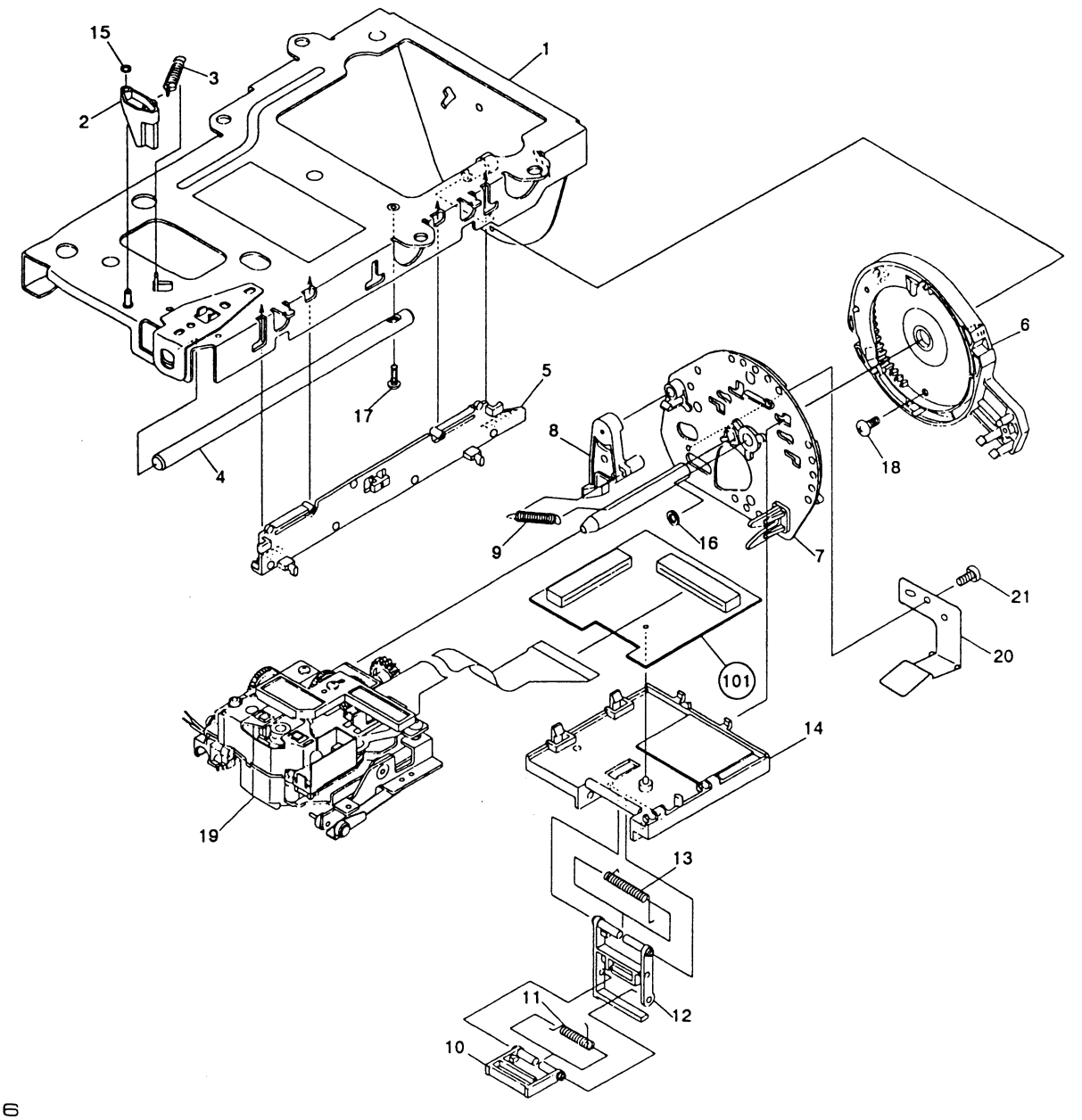
Mark	No.	Description	Part No.
⊙	1	Tilt base (lower) assembly	VXA1578
	2	Slide switch (LD, CDV INSIDE)	OSH1001
	3	Rack spring	VBH1133
	4	Rack gear (lower)	VNL1346
	5	Carriage shaft (lower)	VLL1325
	6	Shaft plate (lower) assembly	VXA1626
	7	S plate spring	VBH1149
	8	.....	
	9	Screw	BBZ30P060FCC
	10	Screw	PPZ20P120FMC
	11	Screw	IPZ26P060FMC
	12	Screw	BMZ26P100FMC
	13	Screw	PMZ20P060FMC
	14	Screw	PMZ20P030FMC
	101	SW holder	VNE1620
	102	Housing assembly	VKP1851
	103	Roller shaft holder	VNE1666
	104	S plate holder	VNE1621



2.11 TILT BASE (UPPER) SECTION

Parts List

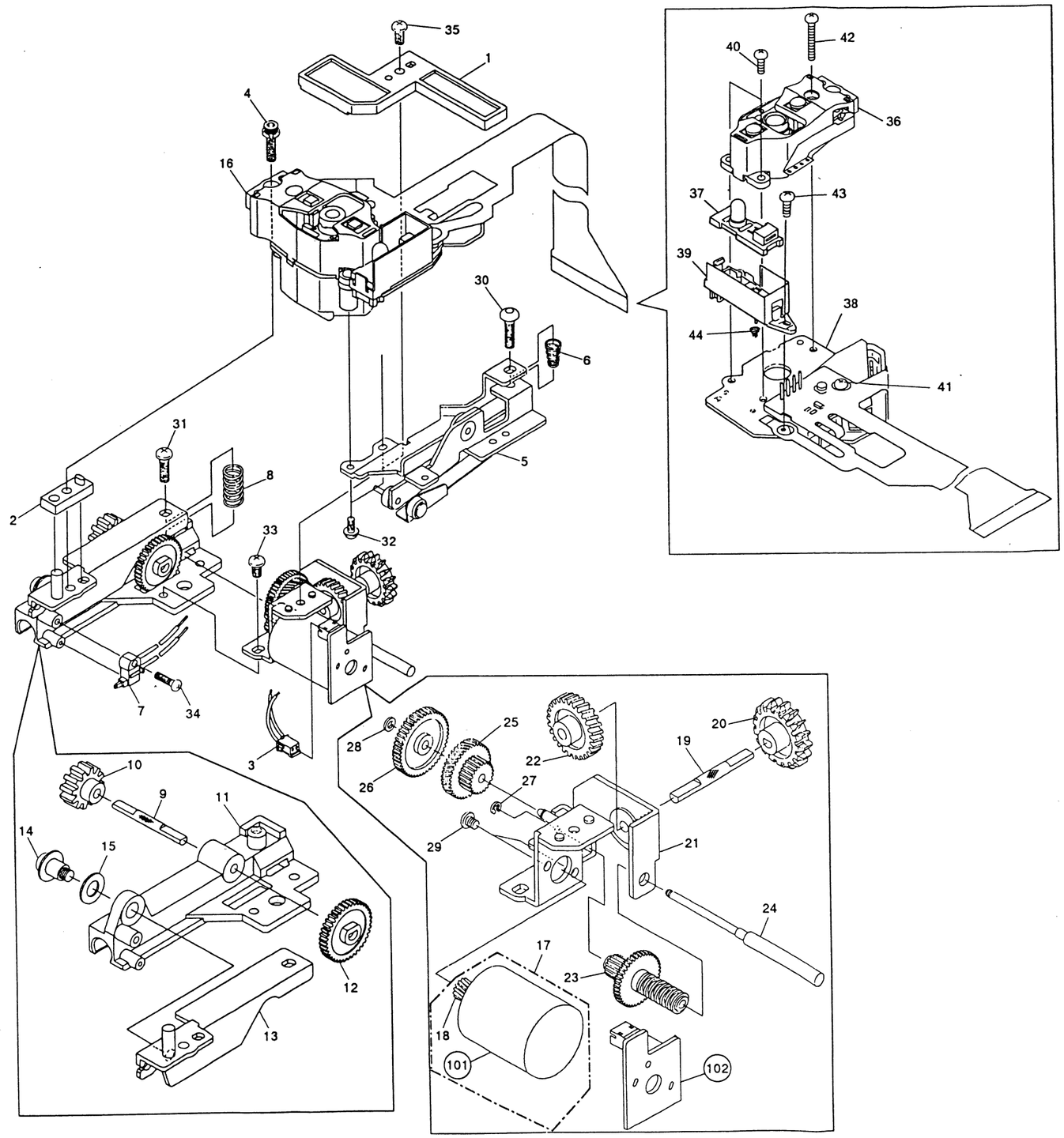
Mark	No.	Description	Part No.
	1	Tilt base (upper) assembly	VXA1580
	2	SW lever	VNL1359
	3	SW lever spring	VBH1150
	4	Carriage shaft (upper)	VLL1324
	5	Rack gear (upper)	VNL1345
	6	Internal gear assembly	VXA1491
⊙	7	R plate assembly	VXA1579
	8	Lock lever	VNL1351
	9	Lever spring	VBH1127
	10	Harness guide (C)	VNL1361
	11	Guide spring (B)	VBH1155
	12	Harness guide (B)	VNL1408
	13	Guide spring (A)	VBH1166
	14	Harness guide (A)	VNL1349
	15	Washer	WT16D032D025
	16	Washer	WT36D072D050
	17	Screw	PMZ20P120FMC
	18	Screw	BBZ26P050FCC
⊙	19	Carriage assembly	VWT1068
	20	Rock plate	VBK1026
	21	Screw	IBZ20P040FCC
	101	CNNB assembly	VWG1194



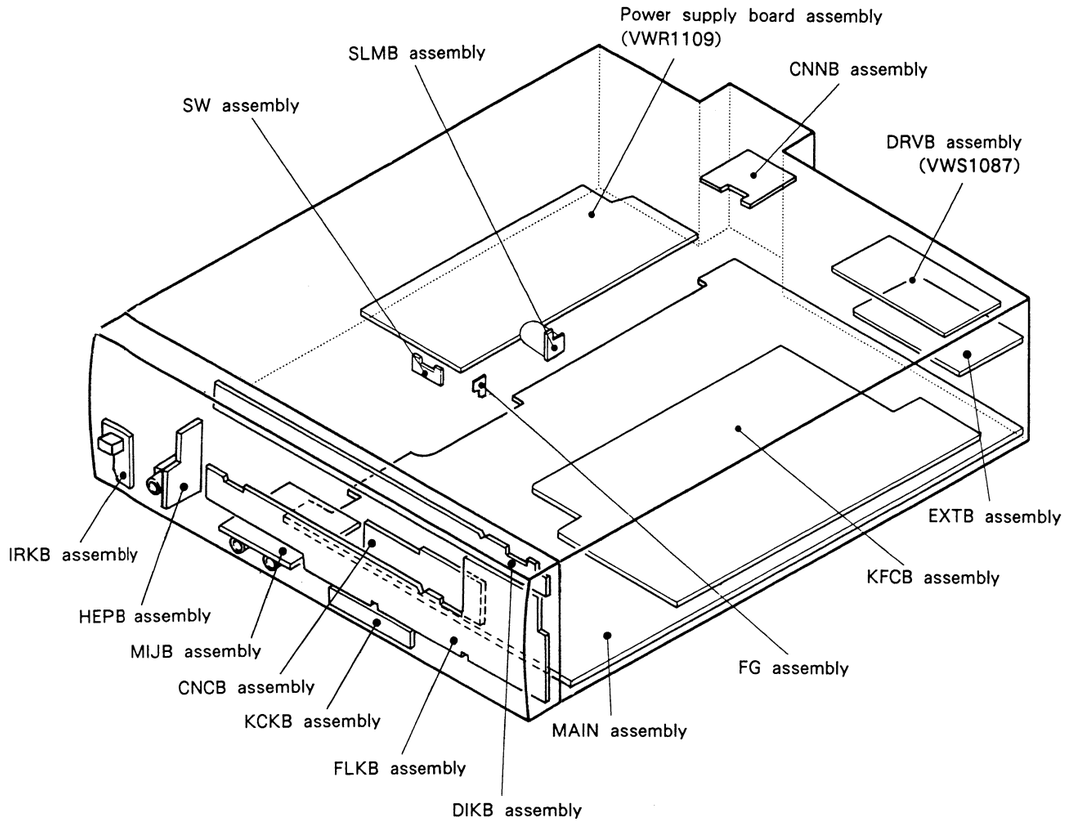
2.12 CARRIAGE ASSEMBLY

Parts List

Mark	No.	Description	Part No.
	1	Flexible holder	VNL1358
	2	PU base	VNT1037
	3	Housing assembly (1.5MP2P)	VKP1852
	4	Bolt 2.6 × 10	VLL1192
	5	TAN base assembly	VXA1752
	6	TAN spring	VBH1151
	7	Slide switch (CD, B INSIDE)	VSK1008
	8	TRKG spring	VBH1152
	9	SL shaft (B)	VLL1334
	10	Gear (F)	VNL1356
	11	Carriage shaft holder	VNT1039
	12	Gear (E)	VNL1355
	13	PU plateassembly	VXA1583
	14	Screw 4	VLL − 183
	15	Spring washer ϕ 4	VEF − 027
	16	Pickup assembly − S	VXX1553
	17	Carriage motor assembly − S	VXX1537
	18	SL gear (A)	VNL1250
	19	SL shaft (C)	VLL1289
	20	Gear (G)	VNL1365
	21	Motor holder assembly	VXA1751
	22	Gear (H)	VNL1357
	23	Gear (C)	VNL1353
	24	SL shaft (A)	VLL1333
	25	Gear (B)	VNL1352
	26	Gear (D)	VNL1354
	27	E ring	YE12FUC
	28	Washer	WT17D034D050
	29	Screw	JGZ20P022FMC
	30	Screw	PMZ26P100FMC
	31	Screw	BMZ26P080FMC
	32	Screw	PMA20P040FMC
	33	Screw	PBZ26P040FMC
	34	Screw	PBZ20P070FCC
	35	Screw	BBZ26P050FMC
	36	Actuator assembly	VXX1551
	37	Sensor assembly	VEX1018
	38	Pre-pickup assembly	VXX1554
	39	Sensor assembly	VNH1024
	40	Screw	PMA20P060FMC
	41	Screw	PMA20P080FMC
	42	Screw	PMA20P140FMC
	43	Screw	BMZ20P060FMC
	44	Sensor spring	VBH1087
	101	Slide motor	VXM1027
	102	SLMB assembly	VNP1295



3. P.C. BOARDS LOCATION



MOTHER ASSEMBLY (VWM1223)

MOTHER assembly is composed of the MAIN, FG and SW assemblies.

FRPB ASSEMBLY (VWM1225)

FRPB assembly is composed of the IRKB, KCKB, DIKB, FLKB, CNCB, MIJB and HEPB assemblies.

KRAB ASSEMBLY (VWM1221)

KRAB assembly is composed of the EXTB and KFCB assemblies

MAIN : **MAIN** BOARD
FG : **FG** COUNTER BOARD
SW : **SW** BOARD
FLKB : **FL** KEY **B**OARD
DIKB : **DI**RECT **K**EY **B**OARD
IRKB : **IR** KEY **B**OARD
HEPB : **HE**ADPHONE **B**OARD
MIJB : **MI**C **J**ACK **B**OARD
KCKB : **K**EY **C**ONTROL **K**EY **B**OARD
CNCB : **C**ON**NEC**TOR **B**OARD
EXTB : **EXT**RA **B**OARD
KFCB : **K**ARAOKE **FUNC**TION **B**OARD

4. SCHEMATIC AND P.C. BOARDS DIAGRAM

1. RESISTORS:
Indicated in Ω , 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k;k Ω , M;M Ω , (F); ± 1%, (G); ± 2%,(K); ± 10%, (M); ± 20% tolerance.

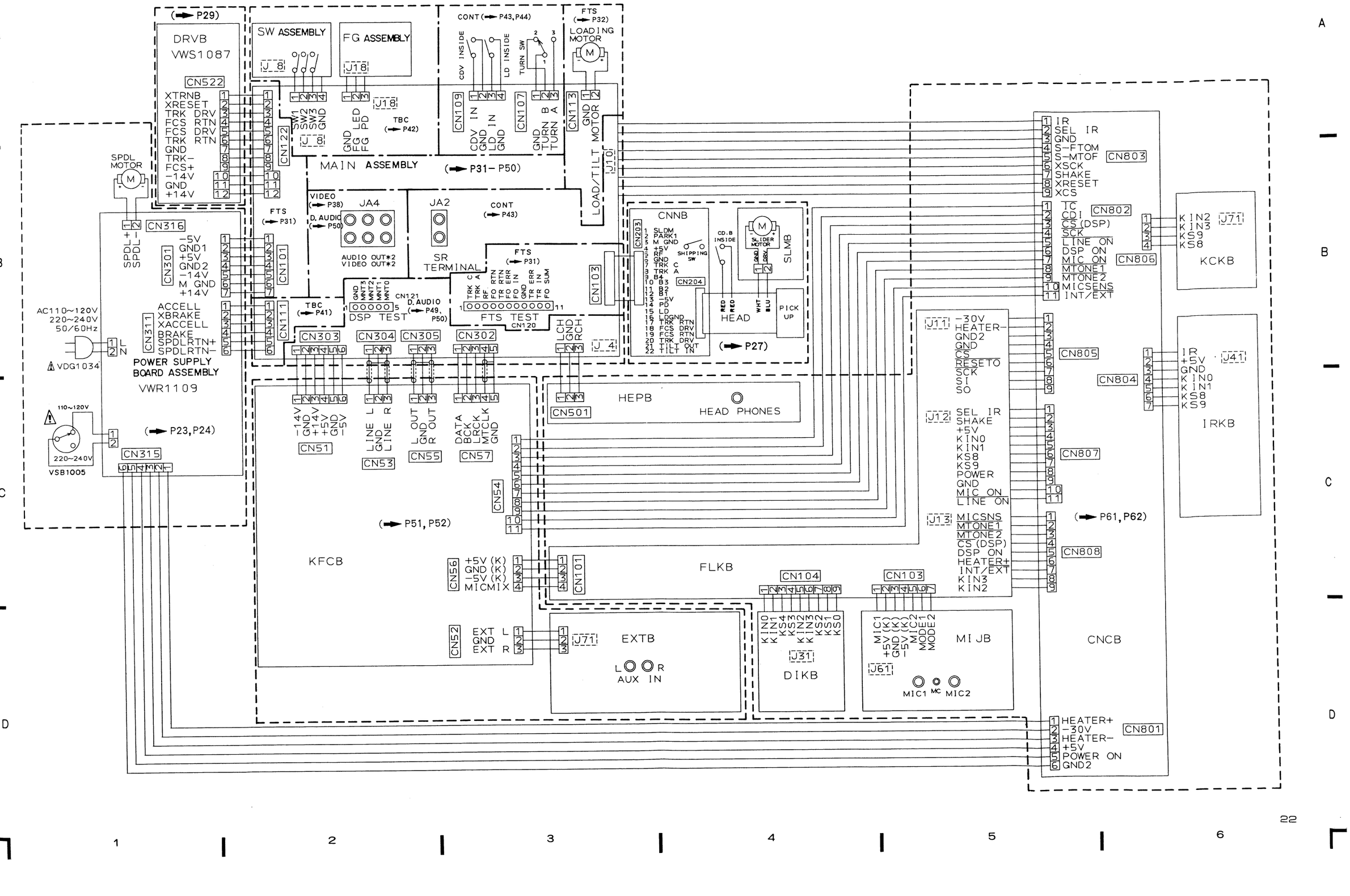
2. CAPACITORS:
Indicated in capacity (μF) /voltage(V)unless otherwise noted p;pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
▭ ;DC voltage (V) at no input signal.
Value in ( ) is DC voltage at rated power.
⇦mA ;DC current at no input signal.

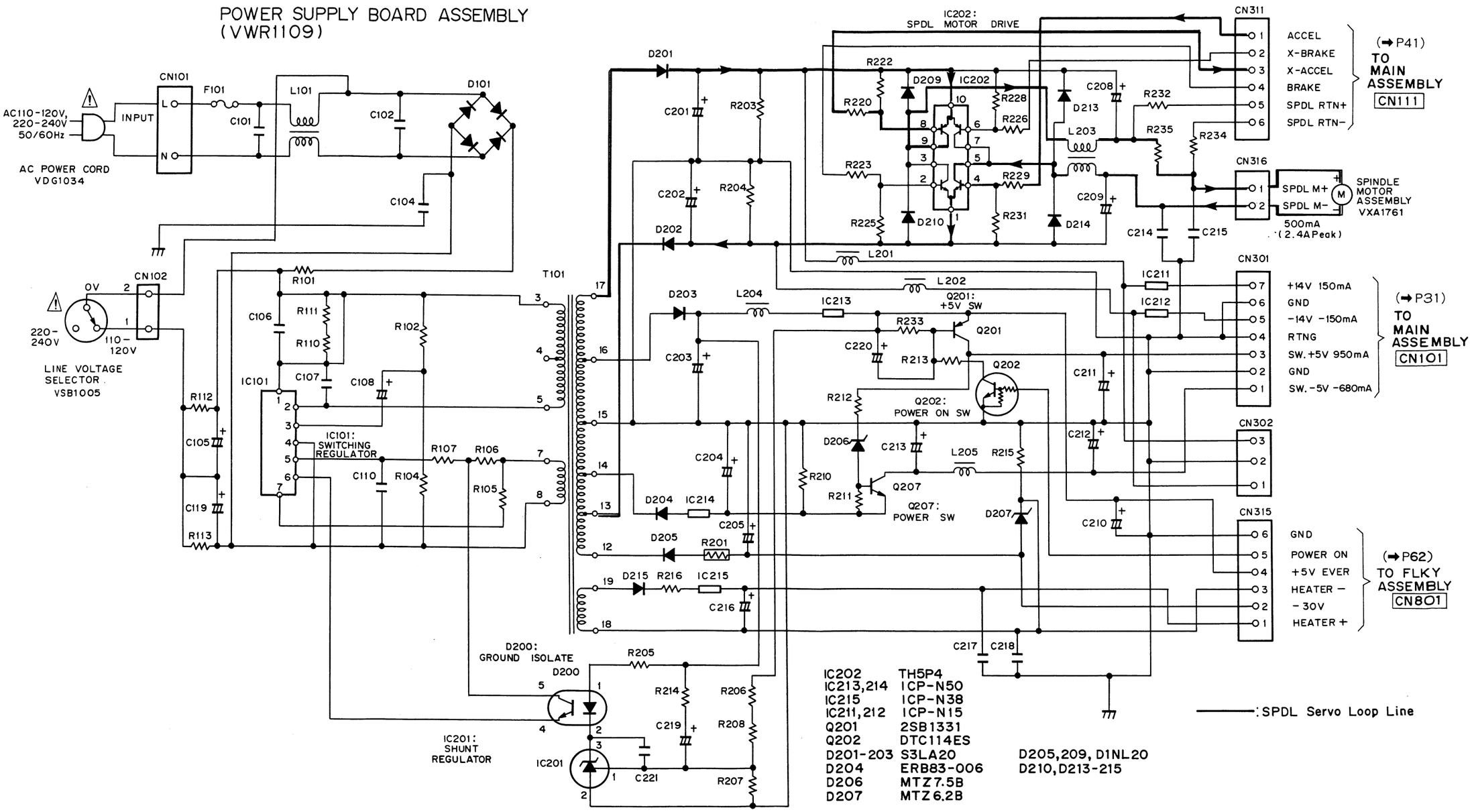
4. OTHERS:
➡ ;Signal route.
⊘ ;Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

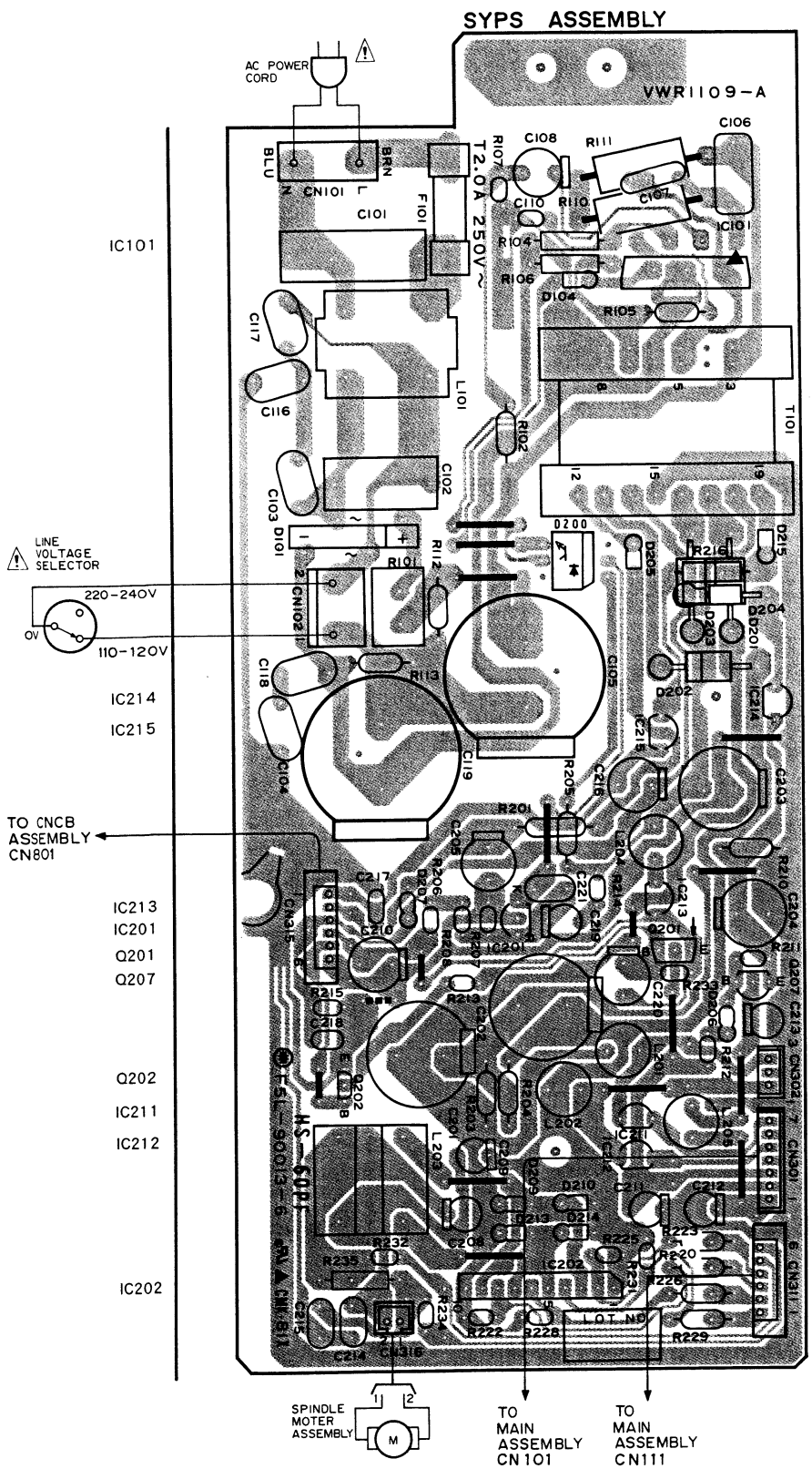
4.1 OVERALL WIRING DIAGRAM



4.2 POWER SUPPLY BOARD ASSEMBLY



• View from component side

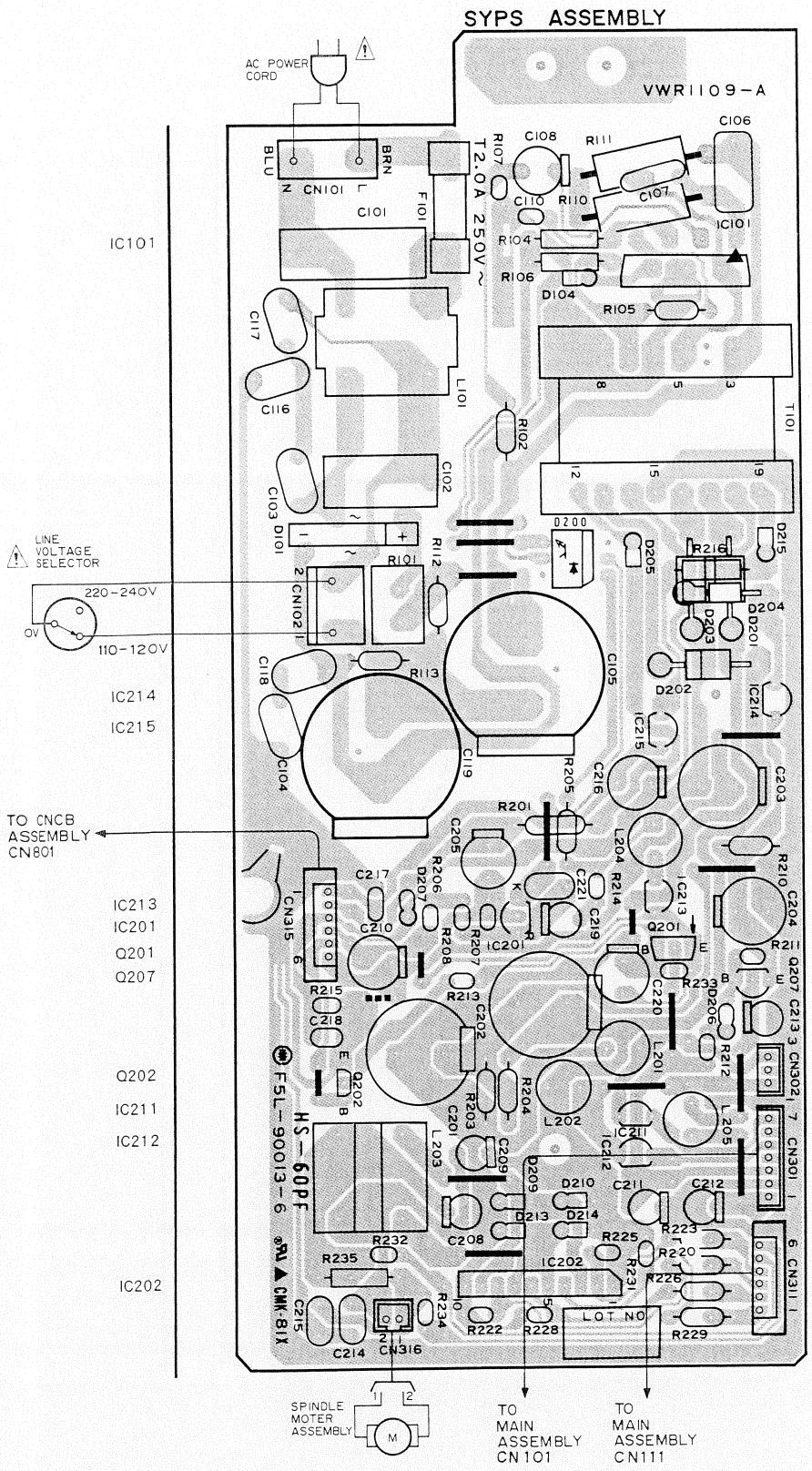


P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

• View from soldering side

• View from component side

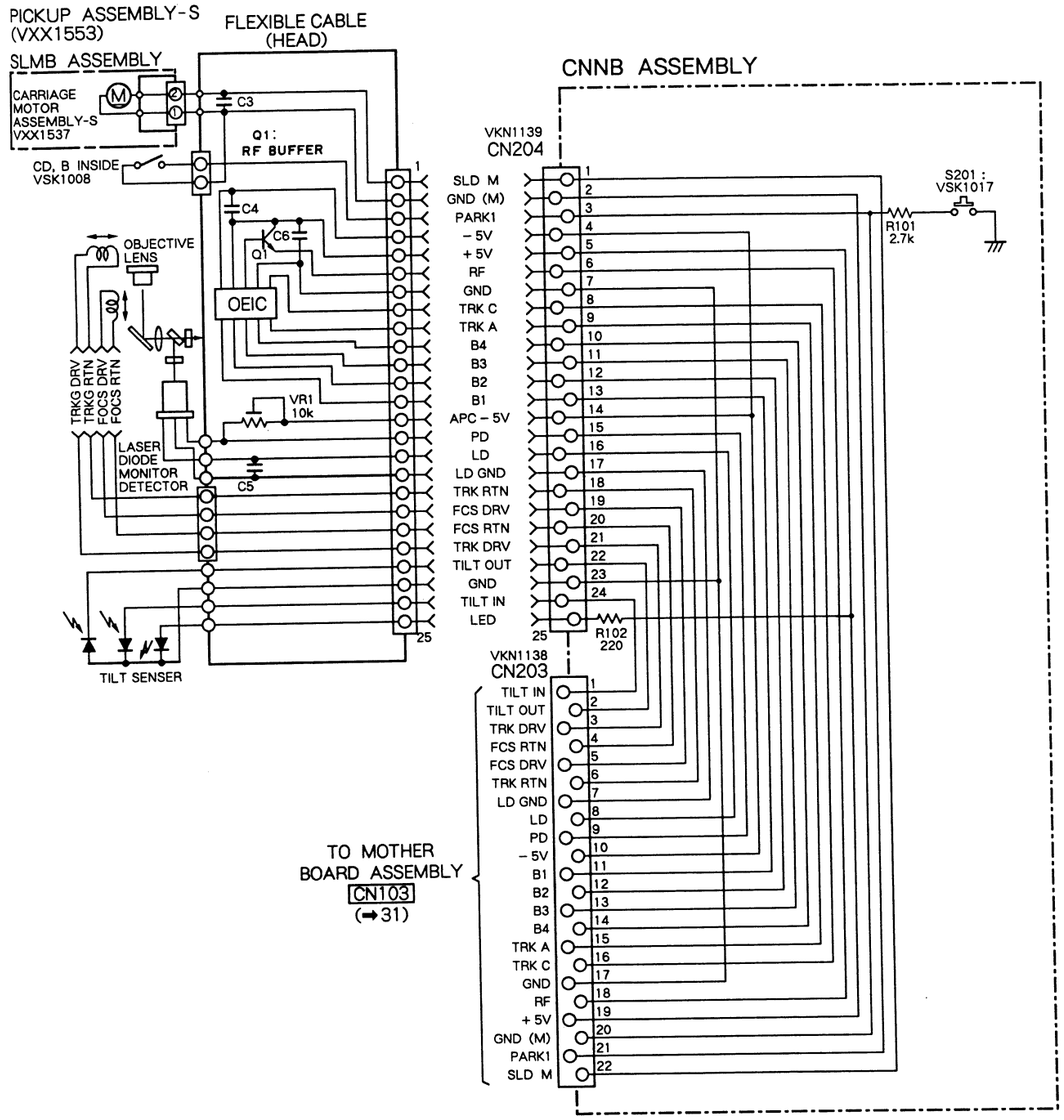


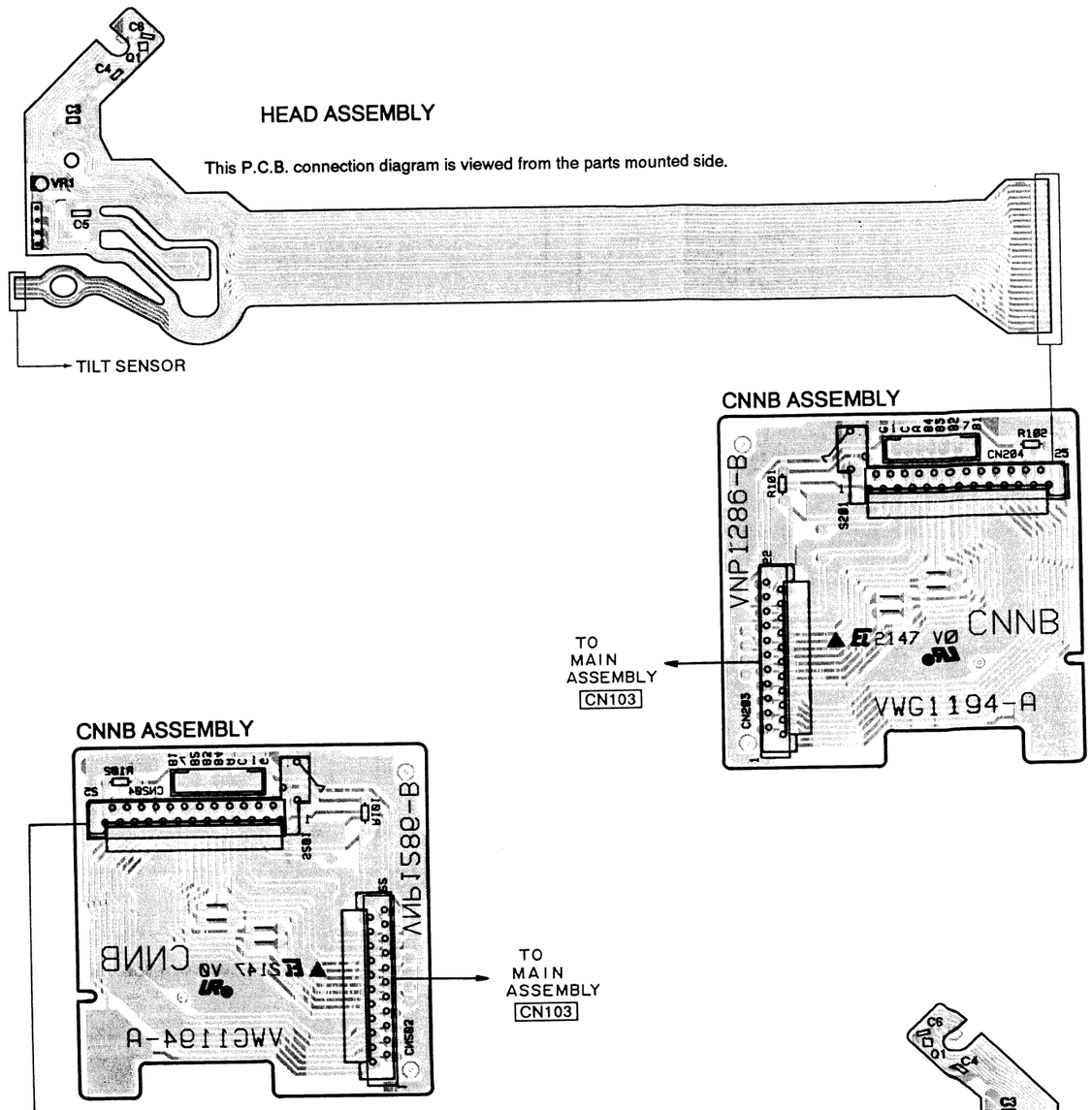
P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transistor
		FET
		Diode
		Zenner diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		Styrol capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Noiseless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with ▭ shows negative terminal.
4. The diode marked with ○ shows cathode side.
5. The transistor terminal marked with ▭ shows emitter.

• View from soldering side

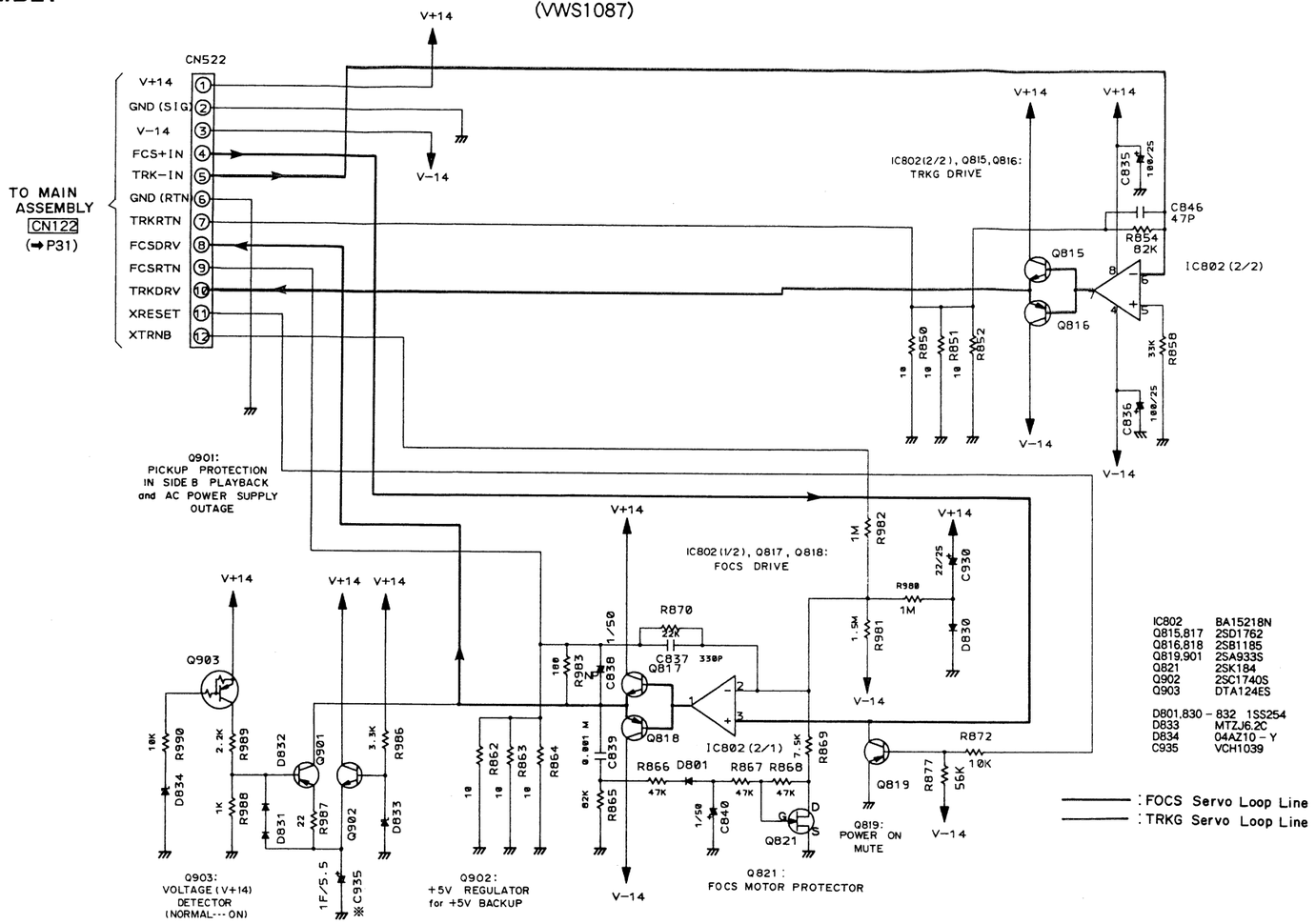
4.3 PICKUP AND CNNB ASSEMBLY





4.4 DRVB ASSEMBLY

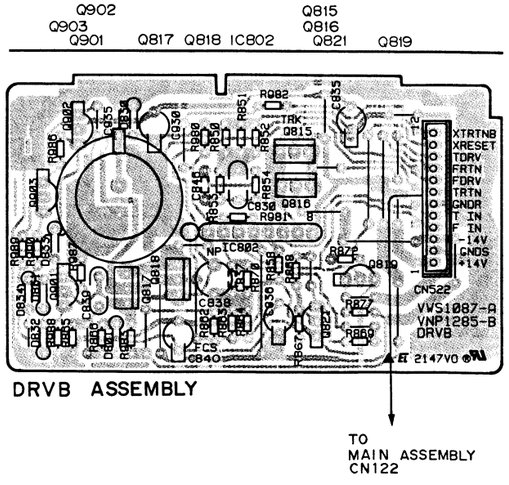
DRVB ASSEMBLY
(VWS1087)



IC802	BA15218N
Q815,817	2SD1762
Q816,818	2SB1185
Q819,901	2SA933S
Q821	2SK184
Q902	2SC1740S
Q903	DTA124ES
D801,830 – 832	1SS254
D833	MTZJ6.2C
D834	04AZ10 – Y
C935	VCH1039

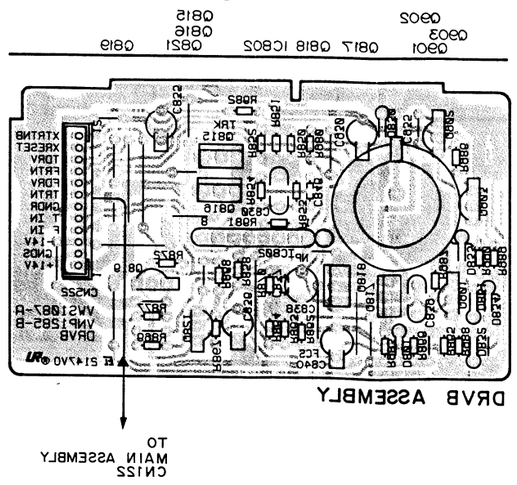
: FOCS Servo Loop Line
: TRKG Servo Loop Line

• View from component side



DRVB ASSEMBLY

• View from soldering side



DRVB ASSEMBLY

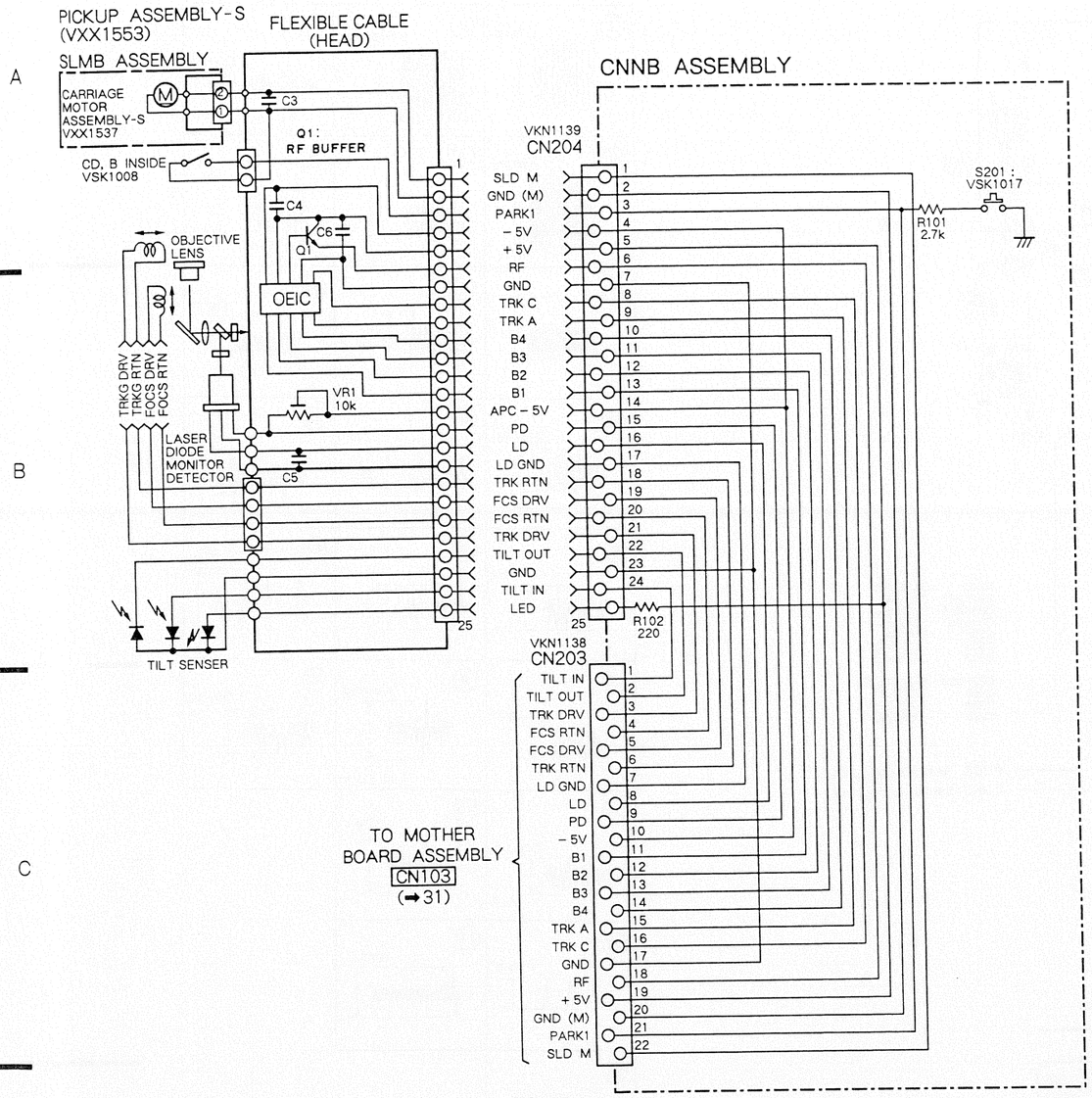
WAVEFORMS OF THE FTS SECTION

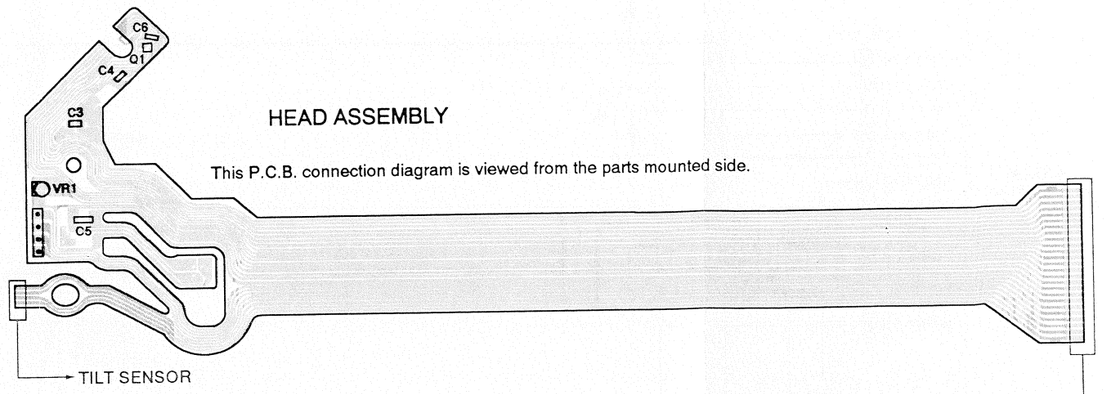
IC801 (CXA1081S)	CN120	IC803 (PM3003)
① 1.5Vp-p	③ 300mVp-p	① 300mVp-p
② 300mVp-p	④ 5Vp-p	⑧ 2Vp-p
⑦ 40mVp-p	⑤ 4Vp-p	㊱ 2Vp-p
⑫ 350mVp-p	⑥ 1.5Vp-p	㊴ 1Vp-p
⑮ 400mVp-p	⑦ 1.5Vp-p	㊸ 500mVp-p
⑳ 400mVp-p	⑨ 1.25Vp-p :at closed	㊼ 150mVp-p
㉑ 700mVp-p	⑩ 1.25Vp-p	
㉒ 7Vp-p	⑪ 2Vp-p	
㉓ 2Vp-p		
㉗ 3Vp-p		

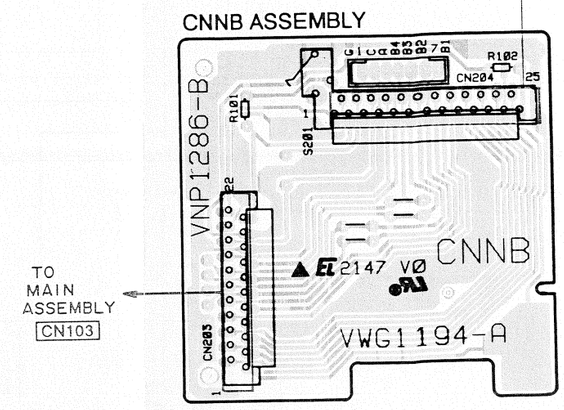
Other Points

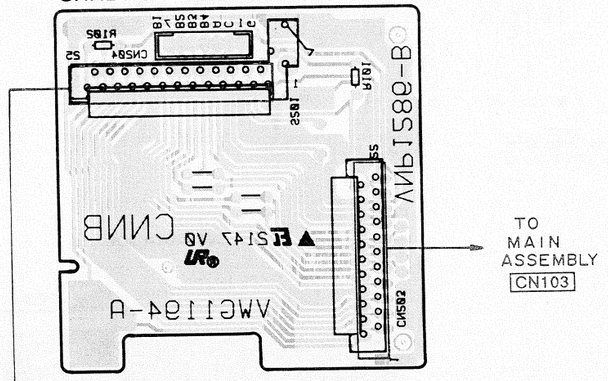
① Q828 collector 400mVp-p

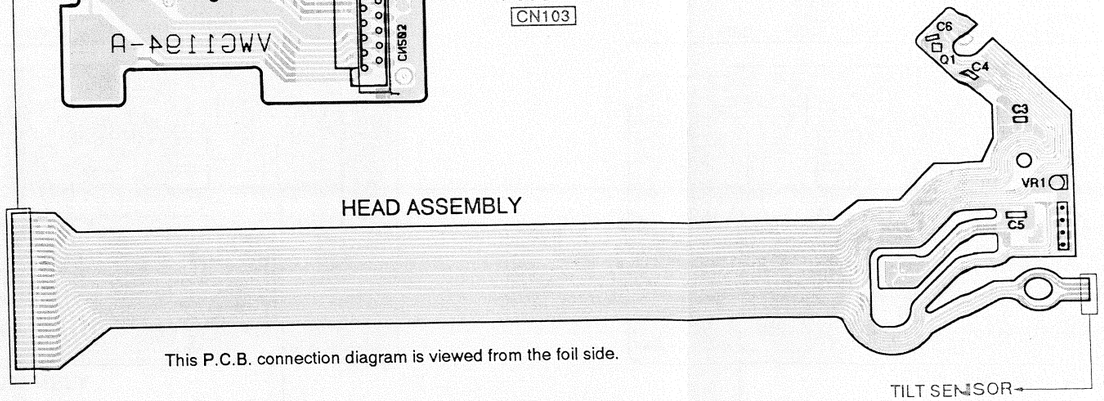
4.3 PICKUP AND CNNB ASSEMBLY





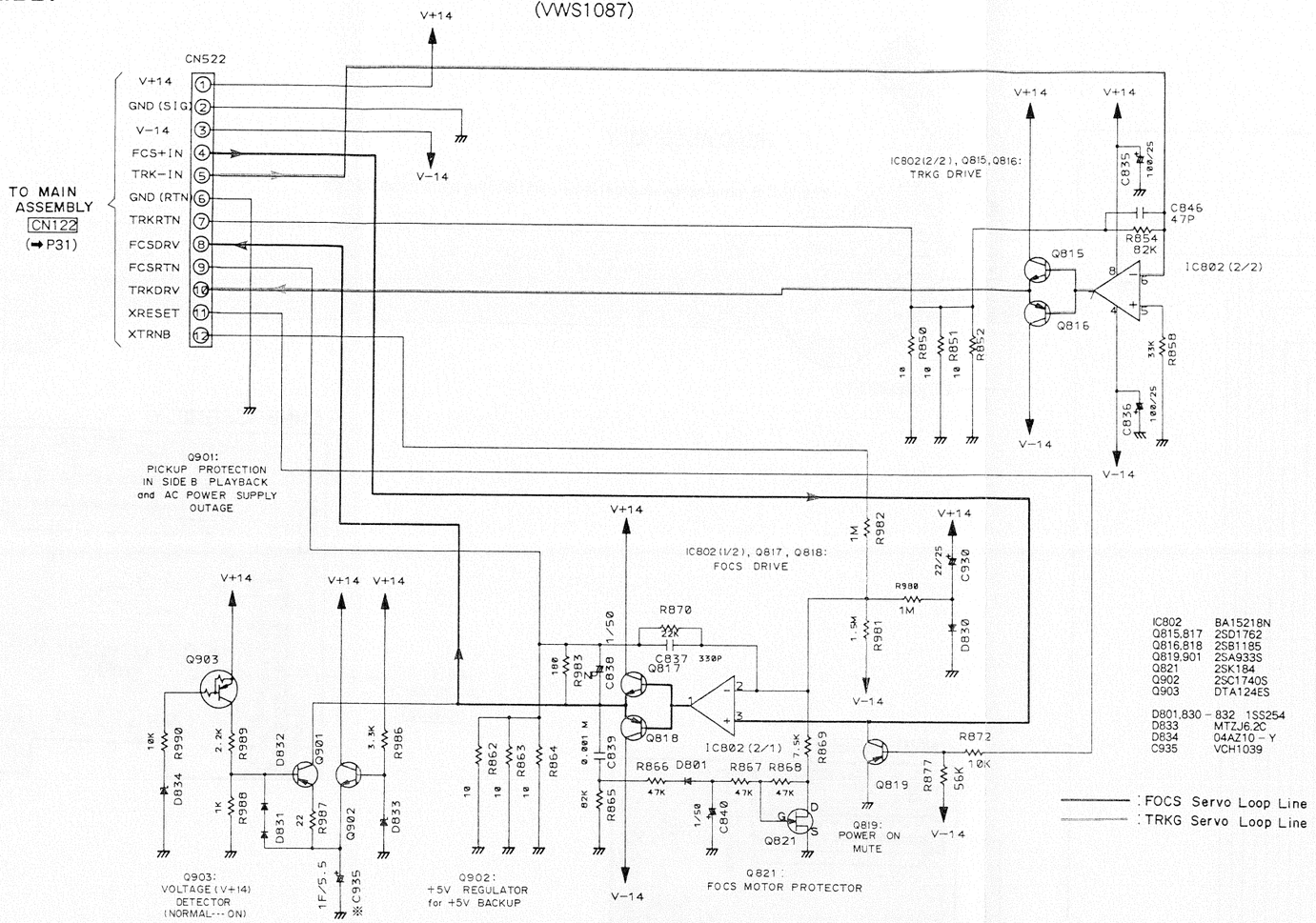




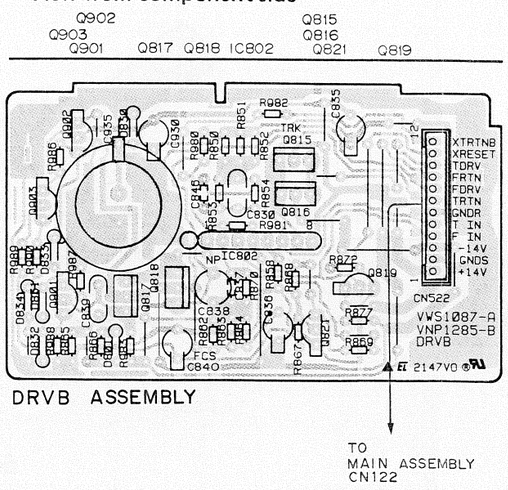


4.4 DRVB ASSEMBLY

DRVB ASSEMBLY
(VWS1087)



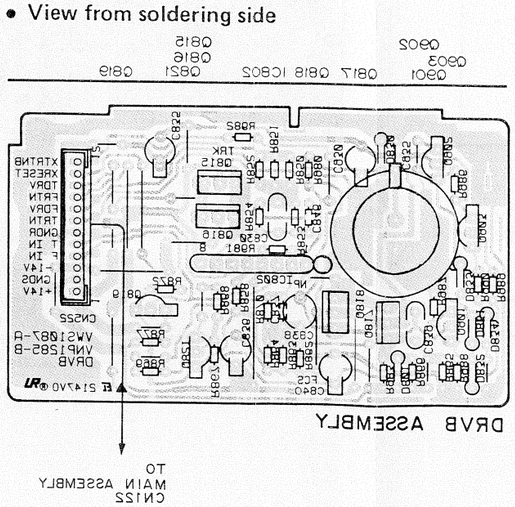
• View from component side



DRVB ASSEMBLY

TO MAIN ASSEMBLY CN122

• View from soldering side



DRVB ASSEMBLY

TO MAIN ASSEMBLY CN122

WAVEFORMS OF THE FTS SECTION

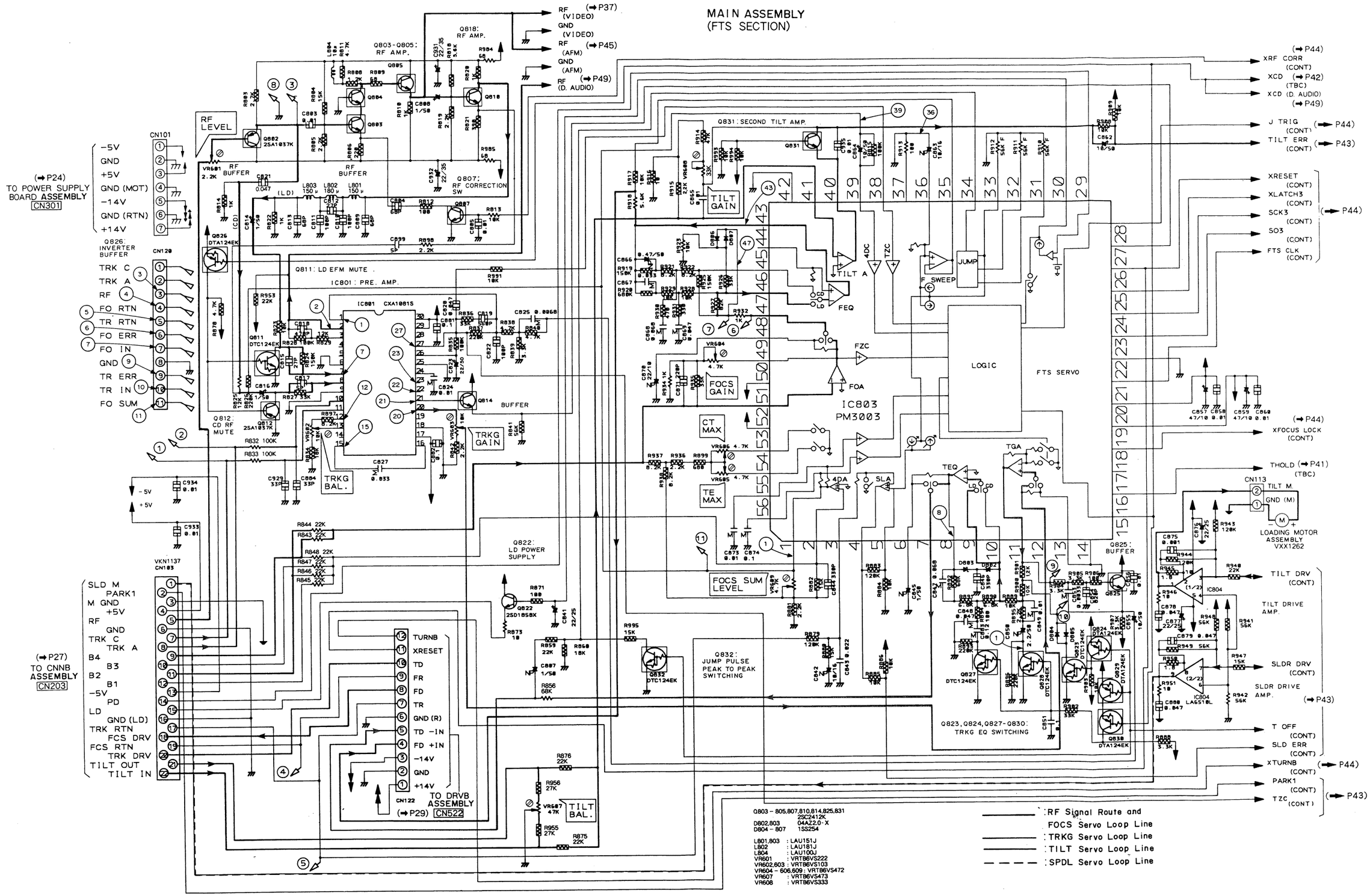
IC801 (CXA1081S)	CN120	IC803 (PM3003)
① 1.5Vp-p	③ 300mVp-p	① 300mVp-p
② 300mVp-p	④ 5Vp-p	⑧ 2Vp-p
⑦ 40mVp-p	⑤ 4Vp-p	㊱ 2Vp-p
⑫ 350mVp-p	⑥ 1.5Vp-p	㊴ 1Vp-p
⑮ 400mVp-p	⑦ 1.5Vp-p	㊸ 500mVp-p
⑳ 400mVp-p	⑨ 1.25Vp-p :at closed	㊼ 150mVp-p
㉑ 700mVp-p	⑩ 1.25Vp-p	
㉒ 7Vp-p	⑪ 2Vp-p	
㉓ 2Vp-p		
㉗ 3Vp-p		

Other Points

① Q828 collector 400mVp-p

4.5 MAIN ASSEMBLY (FTS SECTION)

• View



• View from component side

(➡ P44)
XRF CORR (CONT)
XCD (➡ P42) (TBC)
XCD (D. AUDIO) (➡ P49)
J TRIG (CONT) (➡ P44)
TILT ERR (CONT) (➡ P43)
XRESET (CONT)
XLATCH3 (CONT)
SCK3 (CONT) (➡ P44)
SO3 (CONT)
FTS CLK (CONT)

(➡ P44)
XFOCUS LOCK (CONT)
THOLD (➡ P41) (TBC)
CN113
TILT M.
GND (M)
LOADING MOTOR ASSEMBLY VXX1262

TILT DRV (CONT)
TILT DRIVE AMP.
SLDR DRV (CONT)
SLDR DRIVE AMP. (➡ P43)
T OFF (CONT)
SLD ERR (CONT)
XTURNB (CONT) (➡ P44)
PARK1 (CONT)
TZC (CONT) (➡ P43)

IC205 IC204 IC351 IC804 Q205 Q204 Q351 IC203 IC201 IC801 IC202 Q583 Q582 Q822 IC401 IC405 Q431 IC803 IC402 IC403 IC404 IC602 IC601 Q605 Q604 Q602 Q603 IC603 IC101

MAIN ASSEMBLY VR601 VR607 VR609 VR602 – VR606 VR608 VR521 VR482 VR441 VR481 VC901

TO HEPB ASSEMBLY CN501
TO KFCB ASSEMBLY CN53
TO KFCB ASSEMBLY CN55
TO KFCB ASSEMBLY CN57
TO KFCB ASSEMBLY CN51
TO SYPS ASSEMBLY CN301
TO DRVB ASSEMBLY CN522
TO CNNB ASSEMBLY CN203
LODING MOTOR

VWX1083-A
VWX1082-A
VWX1069-A
VWX
VWX1088-A
VWX1086-A
VWX1085-A
VNZ1232-C
VNP1310-C

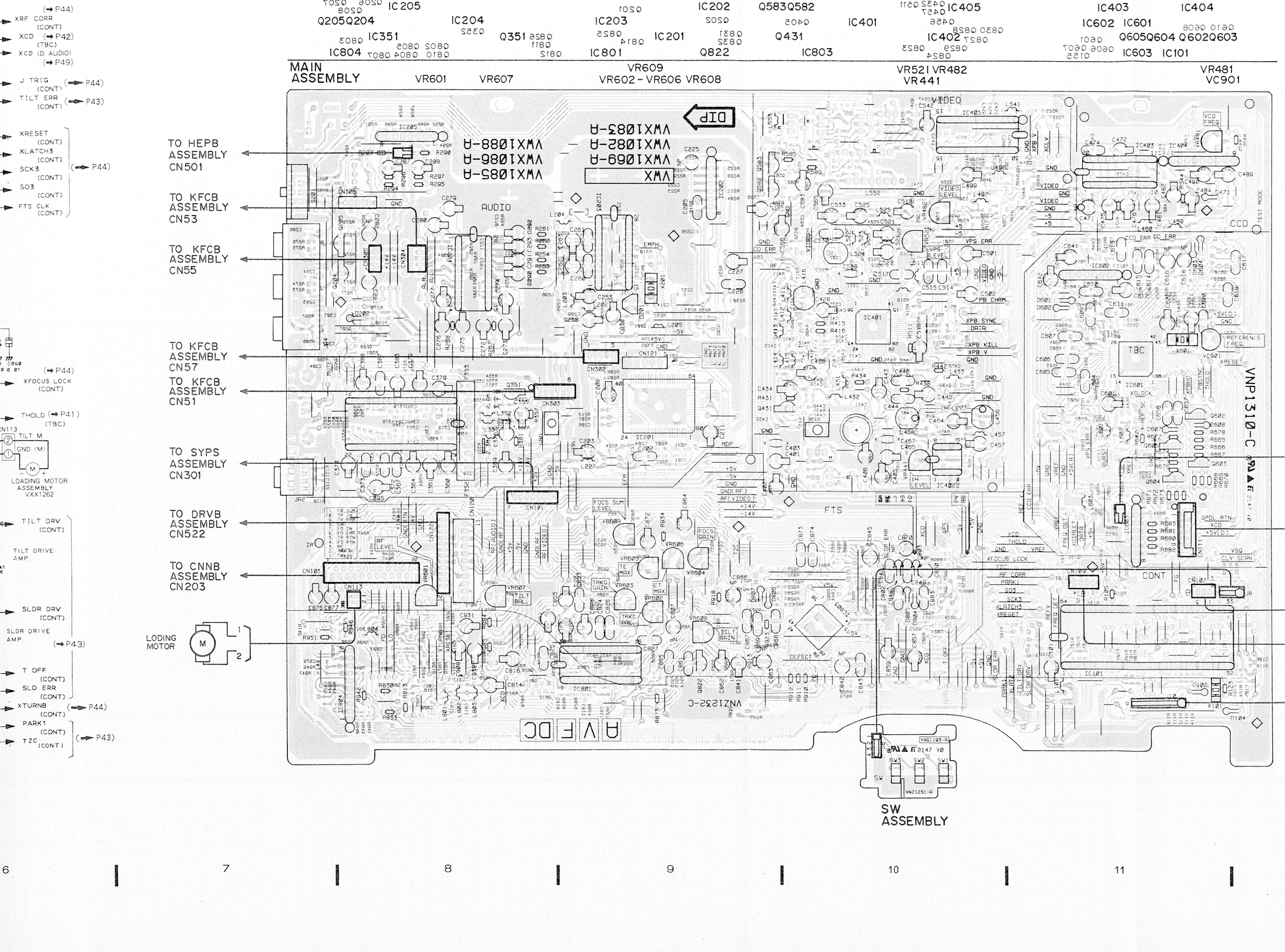
FG ASSEMBLY
TO SYPS ASSEMBLY CN311
TURN SW
CDV INSIDE
LD INSIDE
TO CNCB ASSEMBLY CN803

SW ASSEMBLY
VWG1103-A
VNZ1251-A

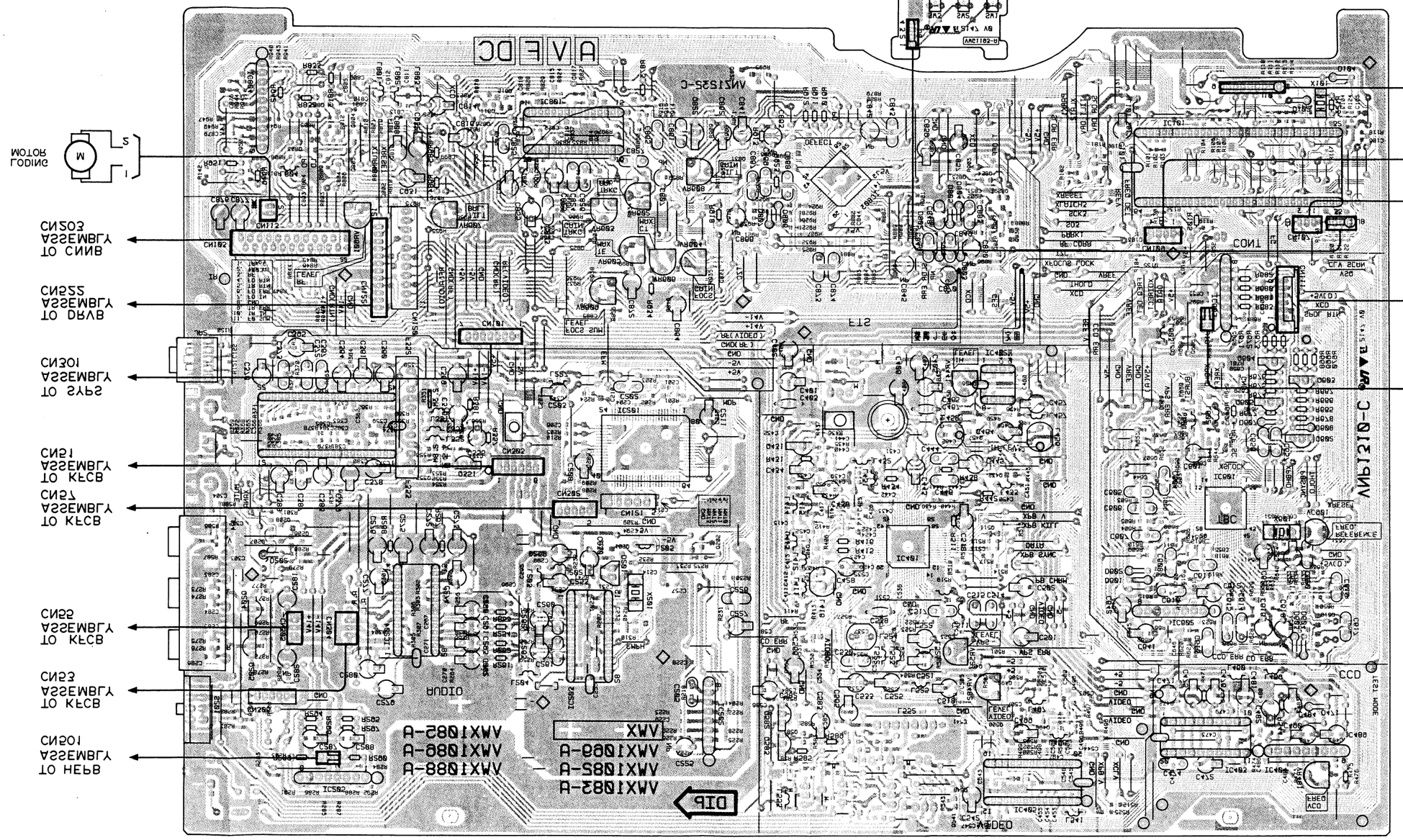
A
B
C
D

6 7 8 9 10 11 12

• View from component side

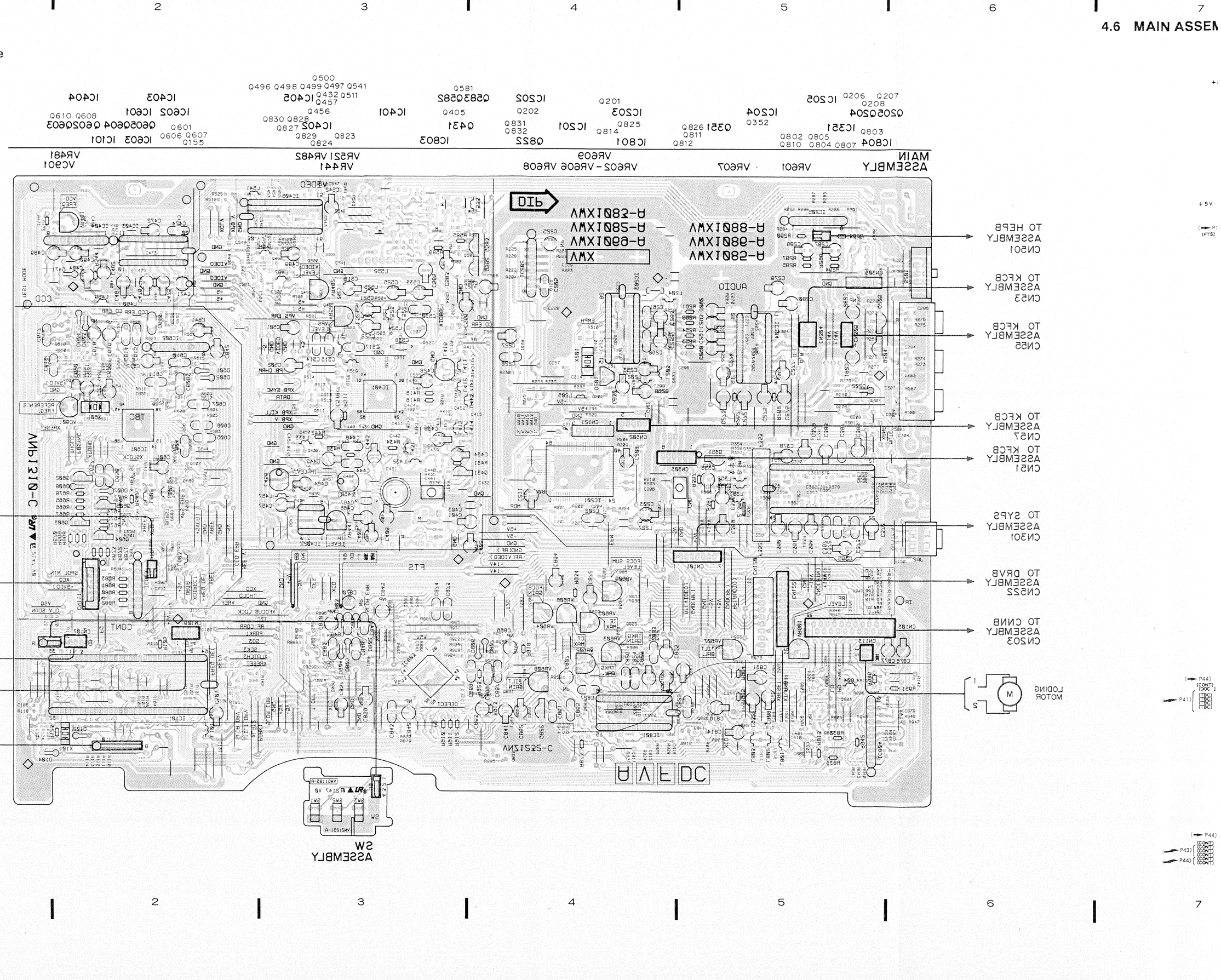


4.6 MAIN ASSEMBLY

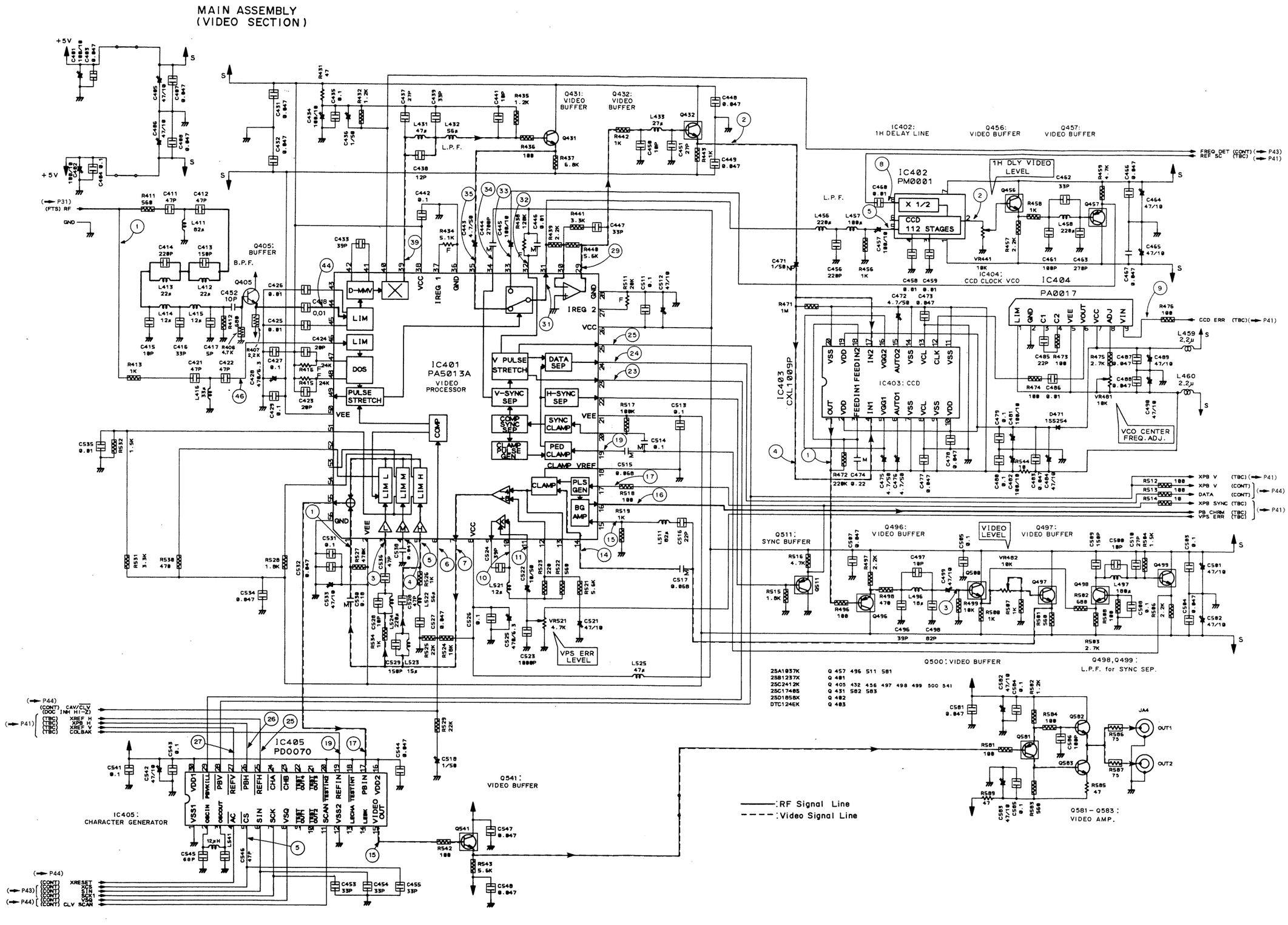


• View from soldering side

• View from soldering side



4.6 MAIN ASSEMBLY (VIDEO SECTION)



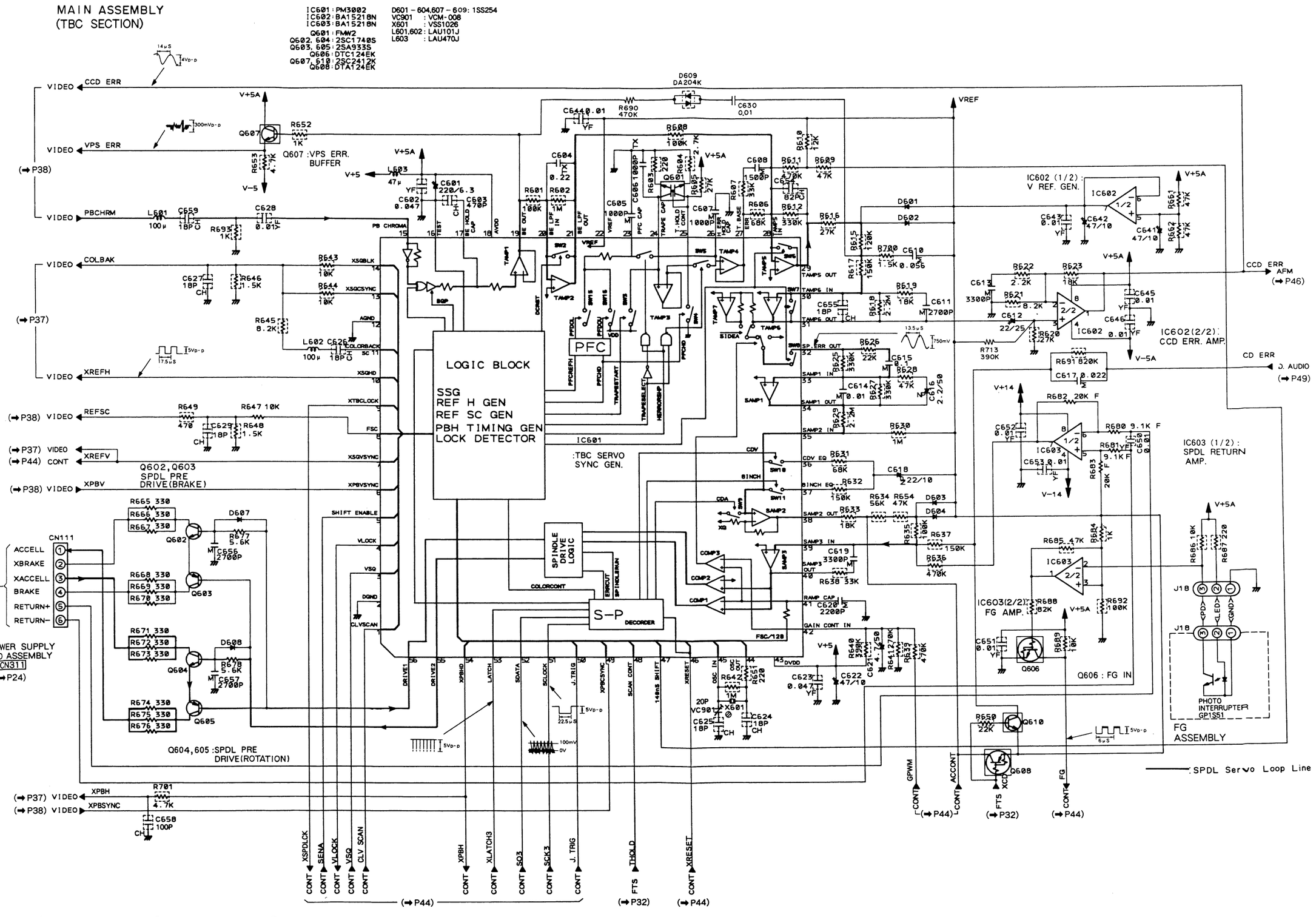
WAVEFORMS OF THE VIDEO SECTION

IC401 (PA5013A)

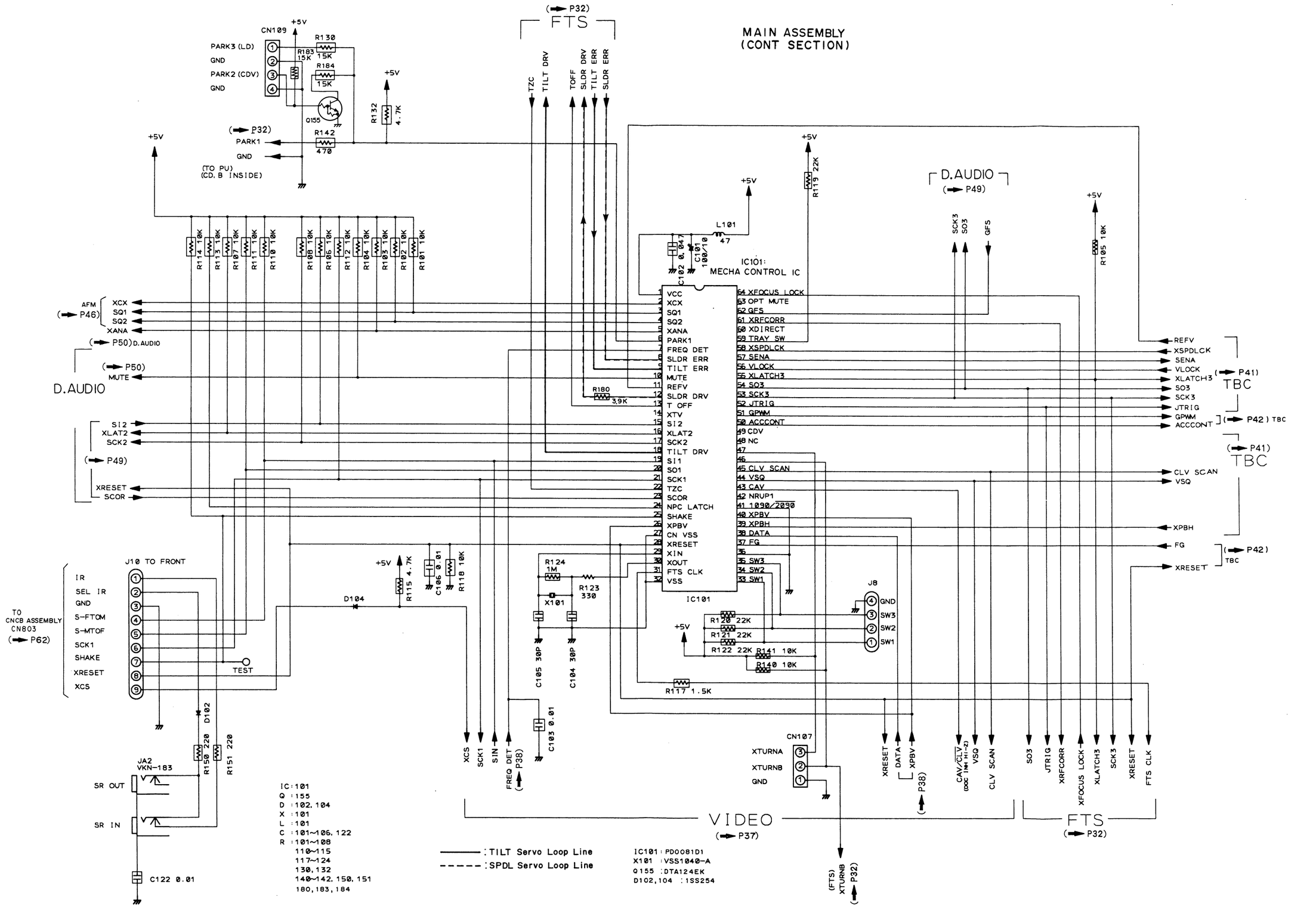
IC404 (PA0017)

① 2Vp-p	⑭ 600mVp-p	㉙ 1.25Vp-p	㊻ 1Vp-p	⑨ approx. 300mVp-p	㉖ 5Vp-p
③ 2Vp-p	⑮ 200mVp-p	㉛ 700mVp-p	IC402 (PM0001)		㉗ 5Vp-p
④ approx. 1Vp-p	⑯ 63.5μS	㉜ 4Vp-p, 17.5mS	② approx. 1Vp-p	IC405 (PD0070)	
⑤ approx. 1Vp-p	⑰ 4Vp-p, 63.5μS	㉝ approx. 600mVp-p	⑤ 600mVp-p	⑤ 4Vp-p	
⑥ 2Vp-p	⑲ 2.5Vp-p	㉞ 2.5Vp-p	⑧ 0.3μS, 450mVp-p	⑮ 1.25Vp-p	
⑦ 2Vp-p	㉓ 5Vp-p, 63.5μS	㉟ 700mVp-p	IC403 (CXL1009)	⑰ 1.25Vp-p	
⑩ 500mVp-p	㉔ 4Vp-p	㊴ approx. 1.2Vp-p	① approx. 1.5Vp-p	⑲ 1Vp-p	
⑪ 1V/div, 2mS/div	㉕ 5Vp-p	㊹ 300mVp-p, 17.5mS	④ approx. 1.5Vp-p	㉕ 5Vp-p	

4.7 MAIN ASSEMBLY (TBC SECTION) AND FG ASSEMBLY

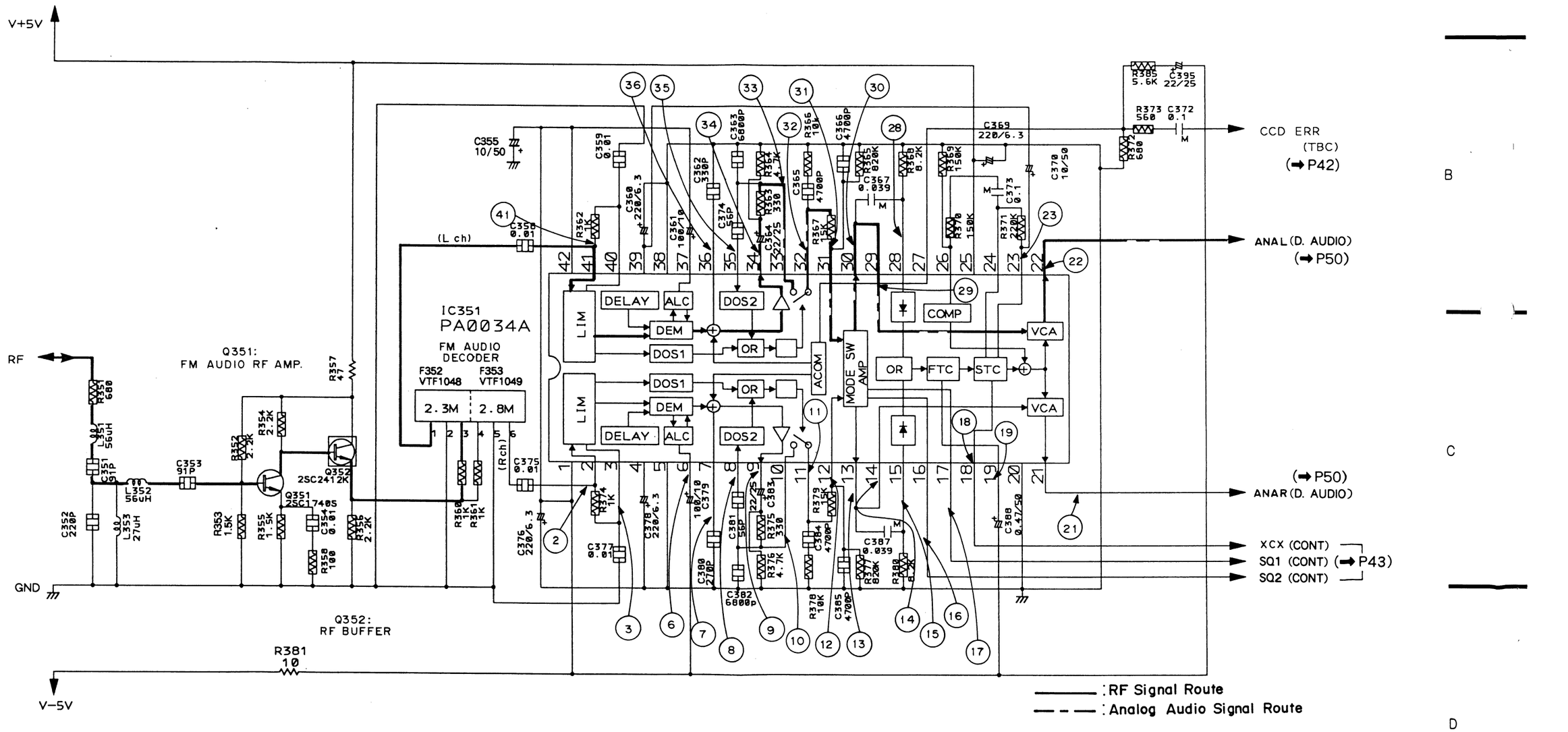


4.8 MAIN ASSEMBLY (CONT SECTION) AND SW ASSEMBLY



4.9 MAIN ASSEMBLY (AFM SECTION)

MAIN ASSEMBLY
(AFM SECTION)



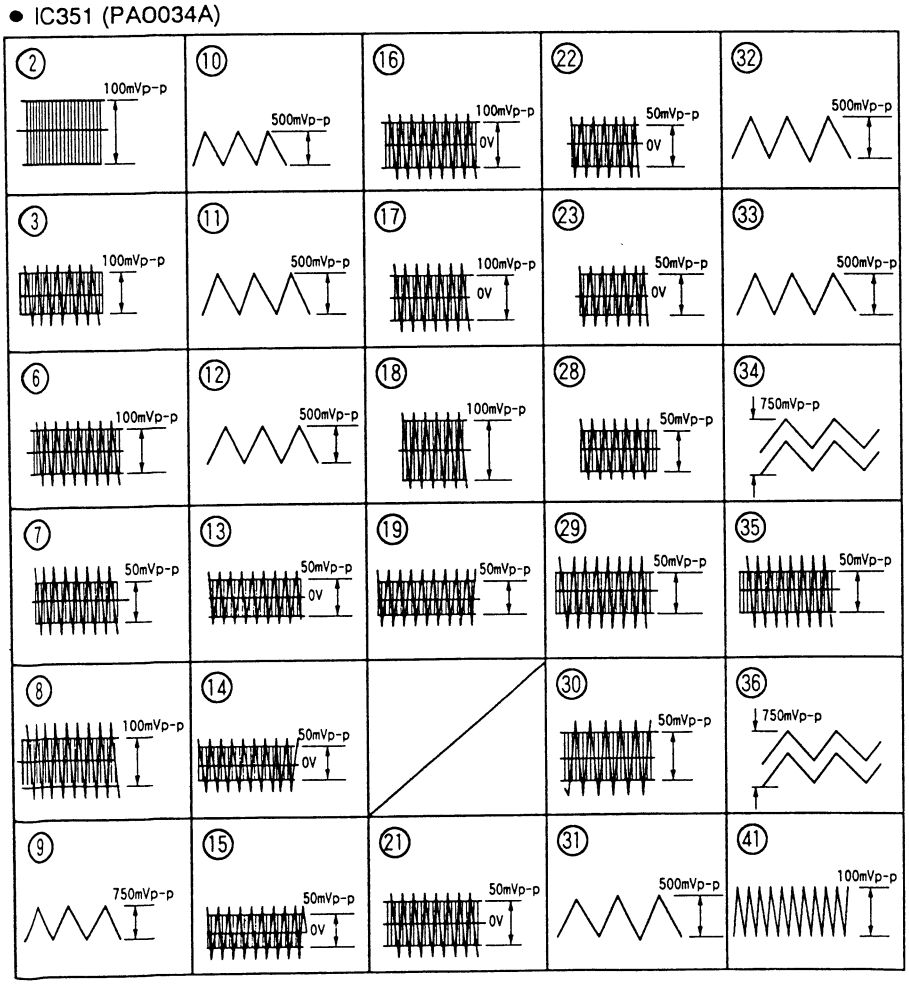
Note: Waveforms and voltages are at the PLAY state.

IC351 (PA0034A)

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	– 5V	15	*	29	*
2	*	16	*	30	*
3	*	17	*	31	*
4	—	18	*	32	*
5	—	19	*	33	*
6	*	20	0	34	*
7	*	21	*	35	*
8	*	22	*	36	*
9	*	23	*	37	—
10	*	24	0	38	—
11	*	25	5V	39	—
12	*	26	0	40	—
13	*	27	0	41	*
14	*	28	*	42	– 5V

*: Refer to Waveforms

● IC351 (PA0034A)



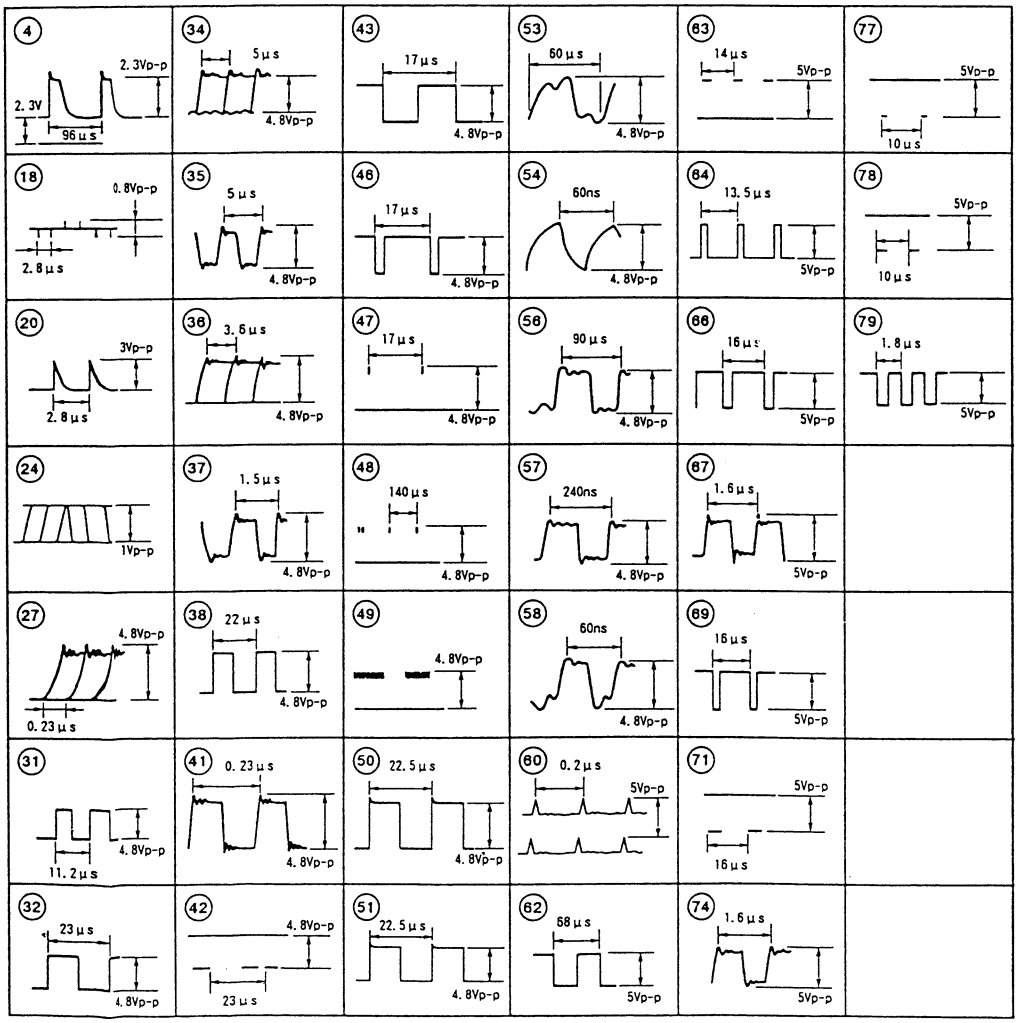
Note: Waveforms and voltages are at the PLAY

IC201 (CXD2500AQ)

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	0	15	0	29	0	43	*	57	*	71	*
2	0	16	4.8	30	0	44	0	58	*	72	5
3	0	17	0	31	*	45	4.8	59	5	73	5
4	*	18	*	32	*	46	*	60	*	74	*
5	0	19	2.4	33	4.8	47	*	61	5	75	0
6	4.8	20	*	34	*	48	*	62	*	76	0
7	0	21	0	35	*	49	*	63	*	77	*
8	4.8	22	2.3	36	*	50	*	64	*	78	*
9	0	23	4.8	37	*	51	*	65	0	79	*
10	0	24	*	38	*	52	0	66	*	80	0
11	0	25	0	39	0	53	*	67	*		
12	0	26	0	40	4.8	54	*	68	0		
13	0	27	*	41	*	55	0	69	*		
14	0	28	0	42	*	56	*	70	5		

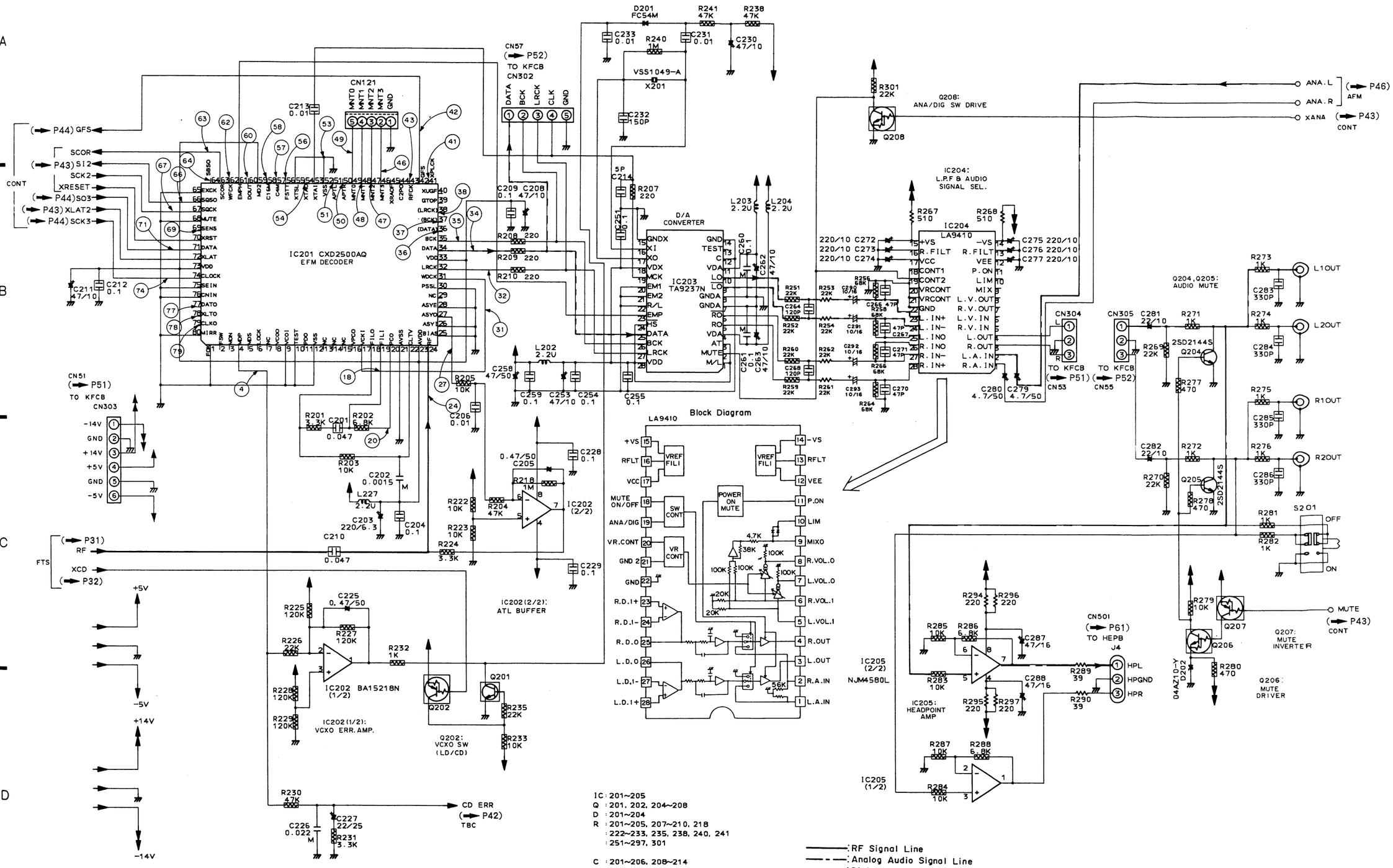
*: Refer to Waveforms

IC201 (CXD2500AQ)



4.10 MAIN ASSEMBLY (D. AUDIO SECTION)

MAIN ASSEMBLY
(D. AUDIO SECTION)

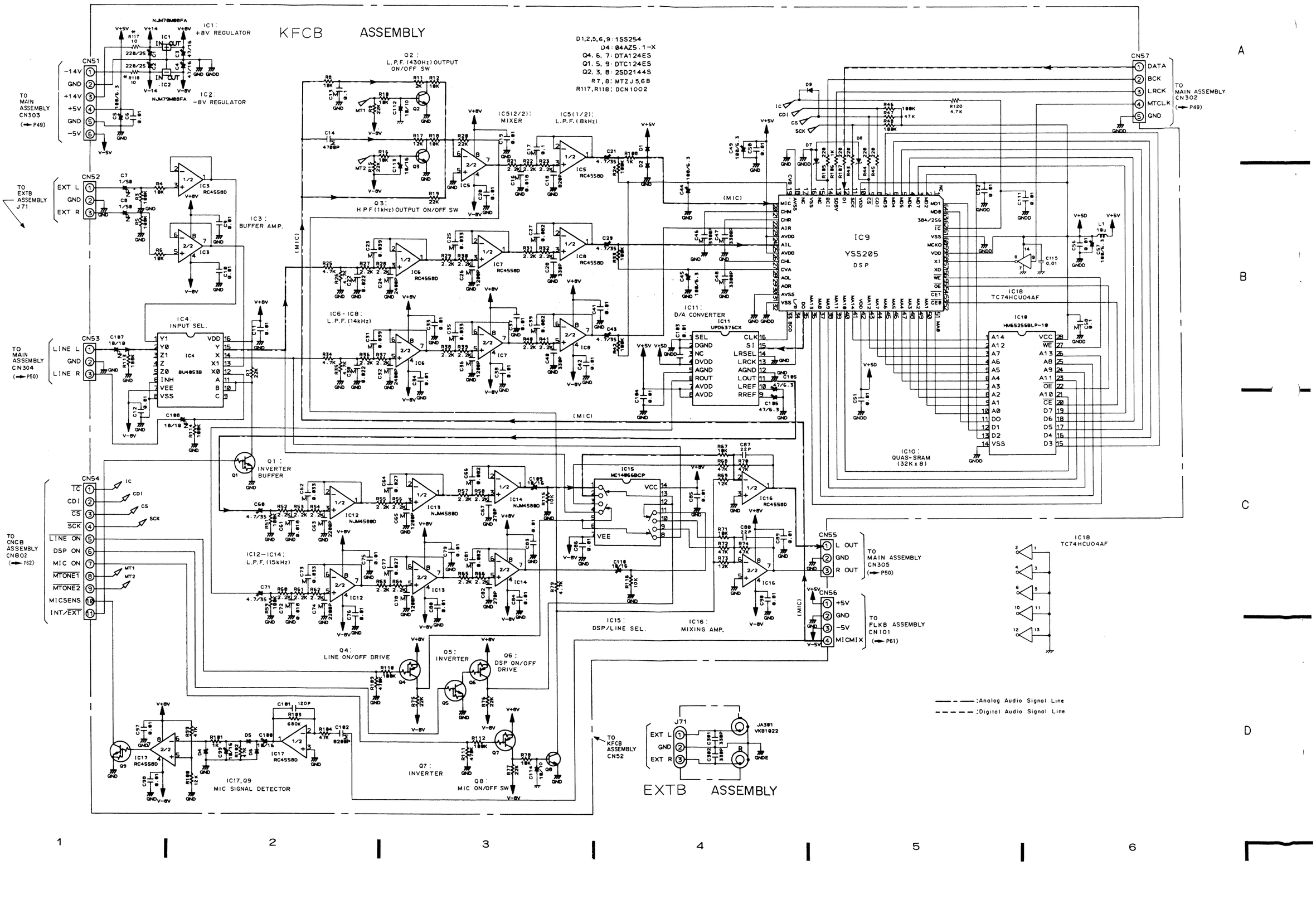


IC : 201~205
Q : 201, 202, 204~208
D : 201~204
R : 201~205, 207~210, 218
: 222~233, 235, 238, 240, 241
: 251~297, 301

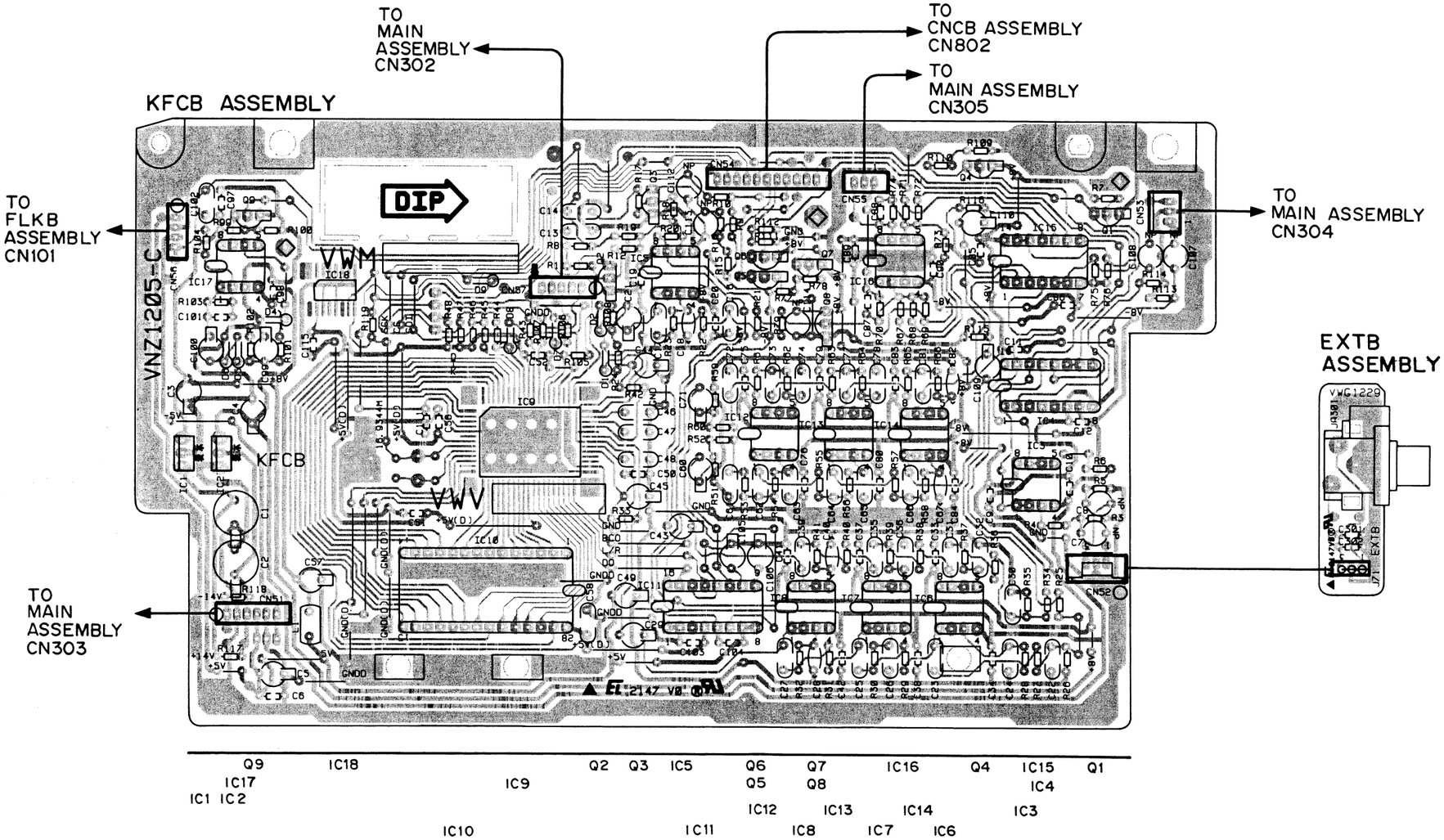
C : 201~206, 208~214
225~233
251, 253~255
258~277
279~289
L : 202~204, 227

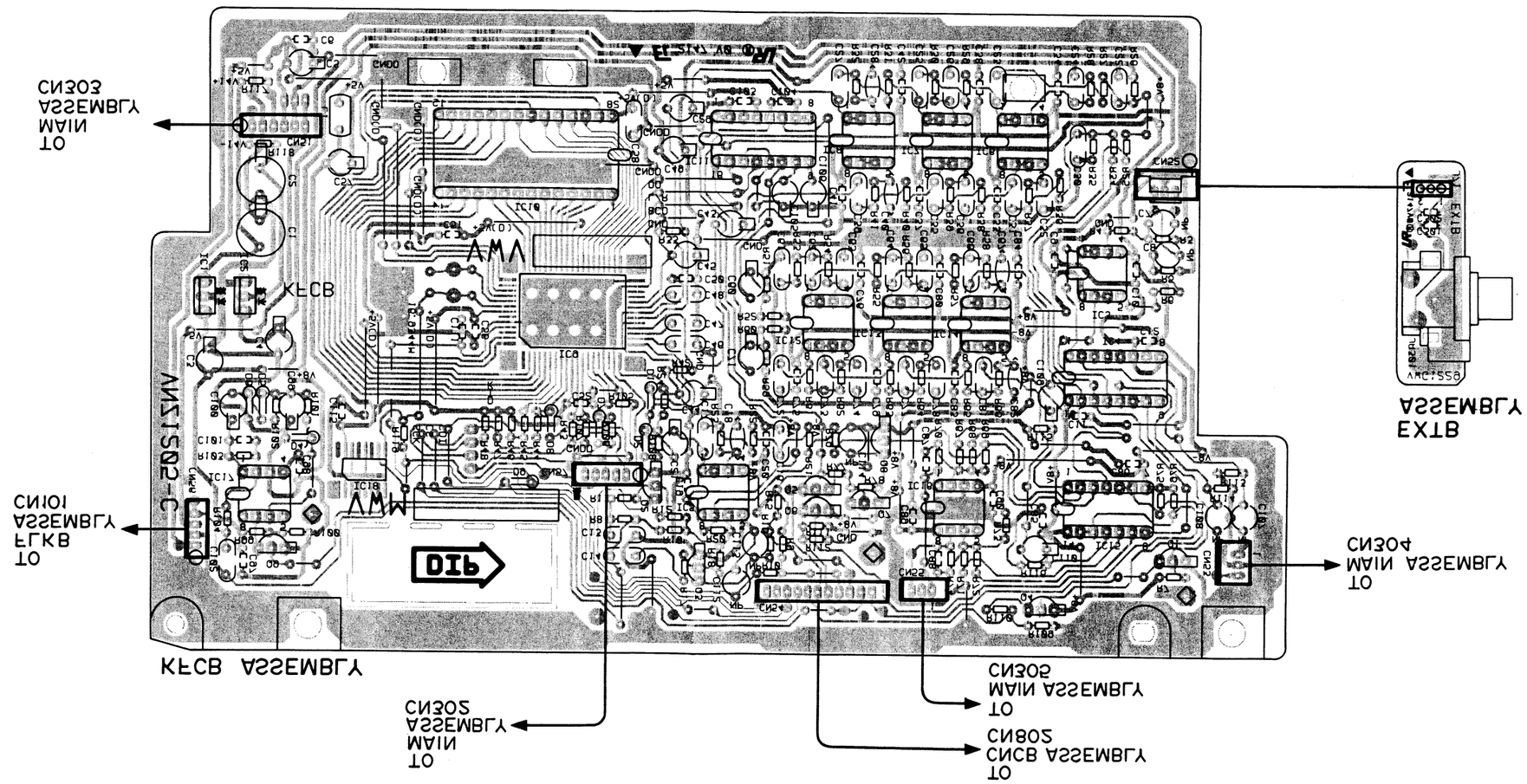
——— : RF Signal Line
— — — : Analog Audio Signal Line
– – – – – : Digital Audio Signal Line

4.11 EXTB AND KFCB ASSEMBLY



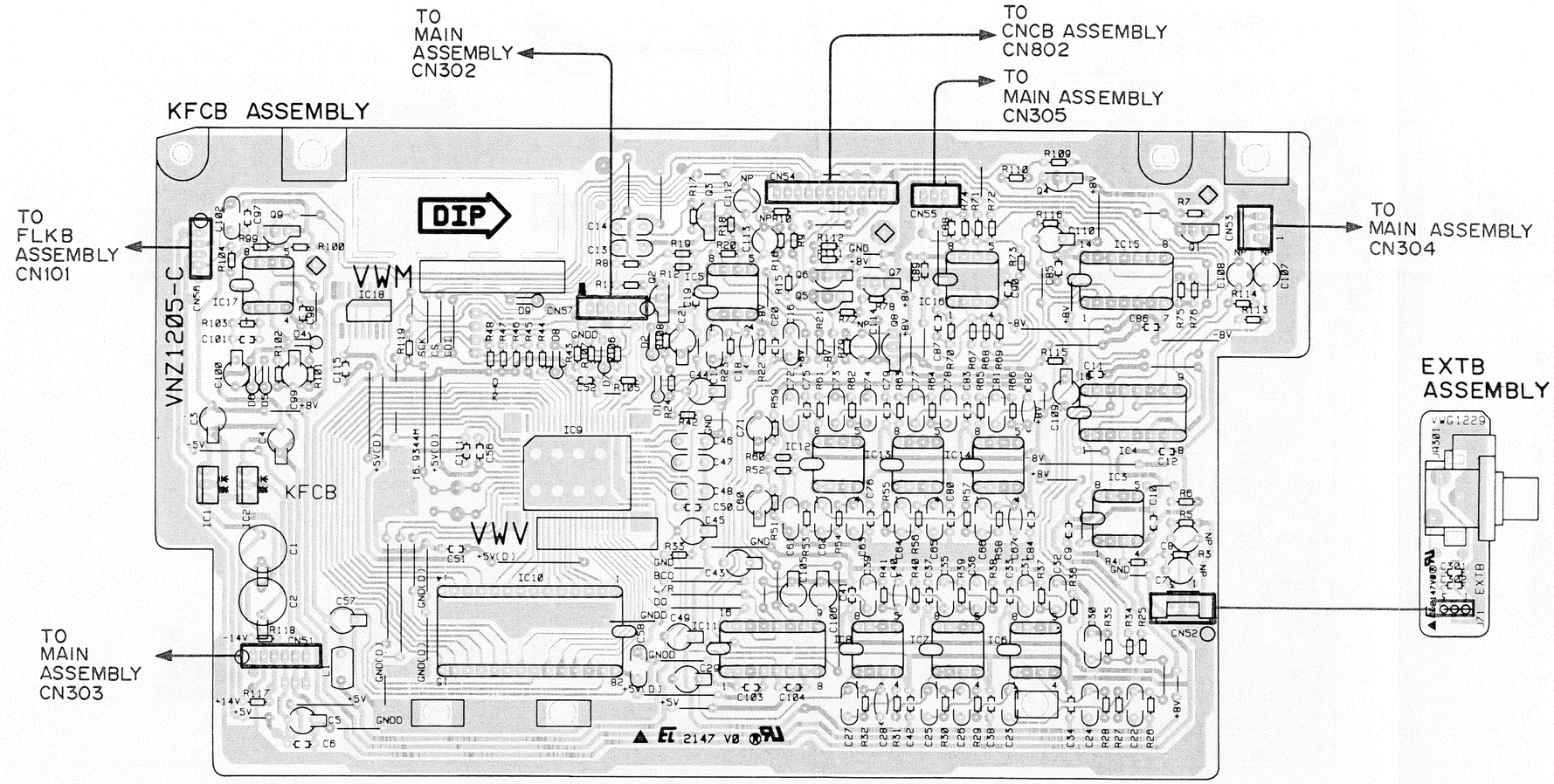
• View from component side



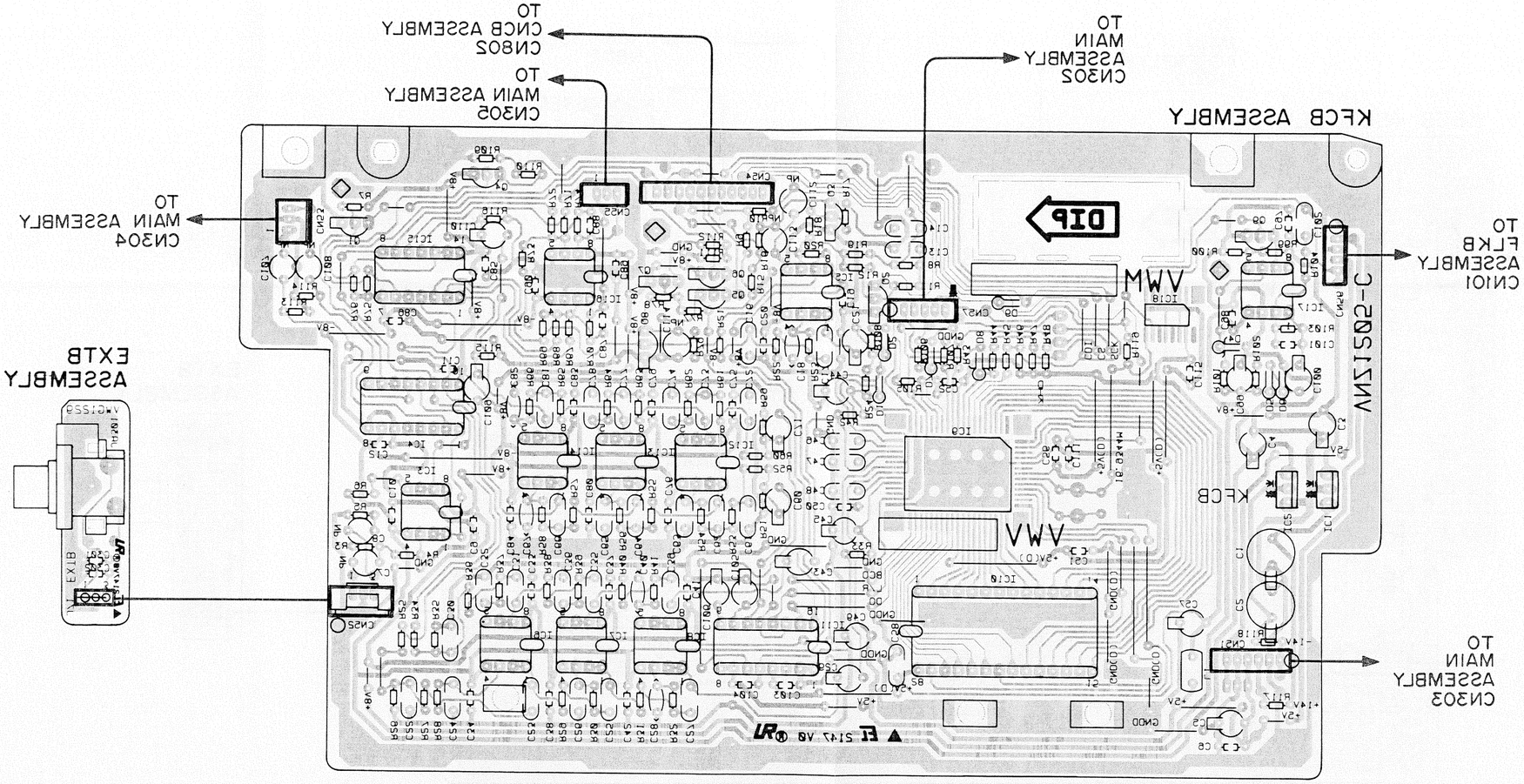


• View from soldering side

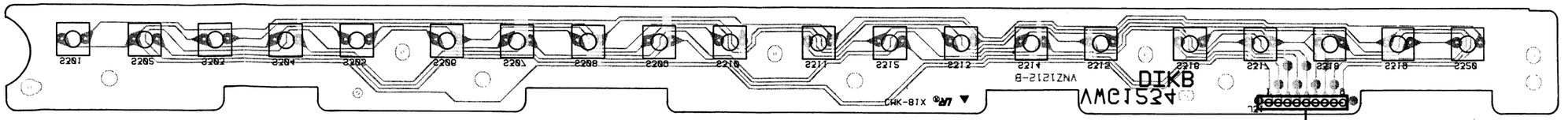
• View from component side



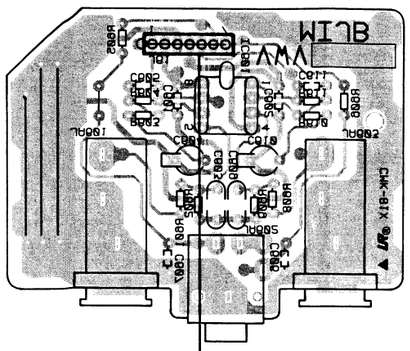
• View from soldering side



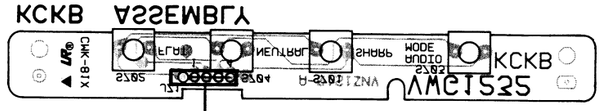
DIKB ASSEMBLY



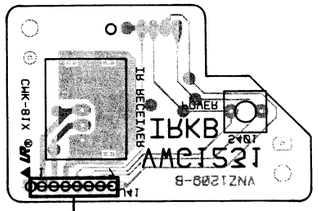
MLIB ASSEMBLY



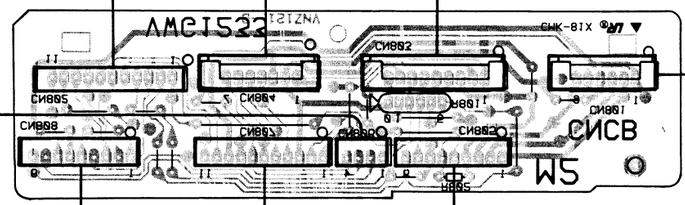
KCKB ASSEMBLY



IRKB ASSEMBLY



CNCB ASSEMBLY



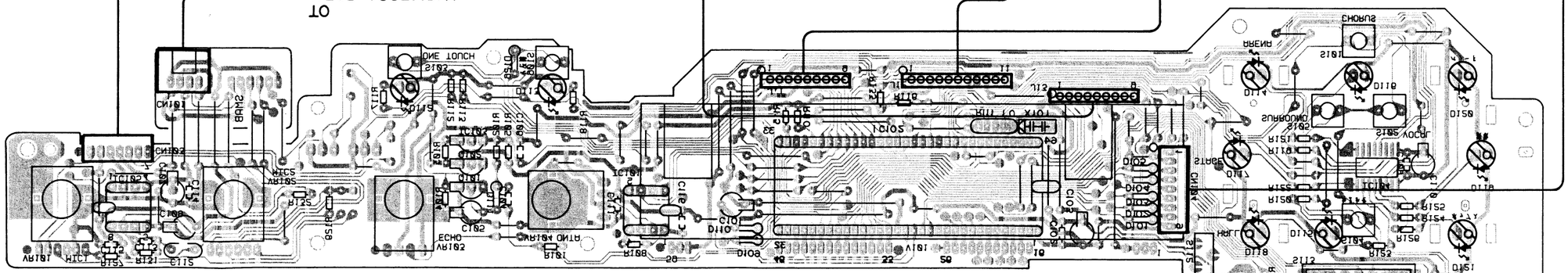
TO KEYB ASSEMBLY CN24

TO MAIN ASSEMBLY CN15

TO SYNC ASSEMBLY CN15

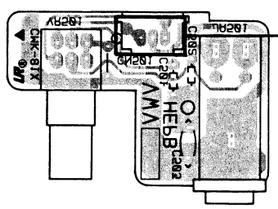
TO KEYB ASSEMBLY CN25

LEDB ASSEMBLY



TO MAIN ASSEMBLY CN4

HEAD ASSEMBLY



• View from soldering side

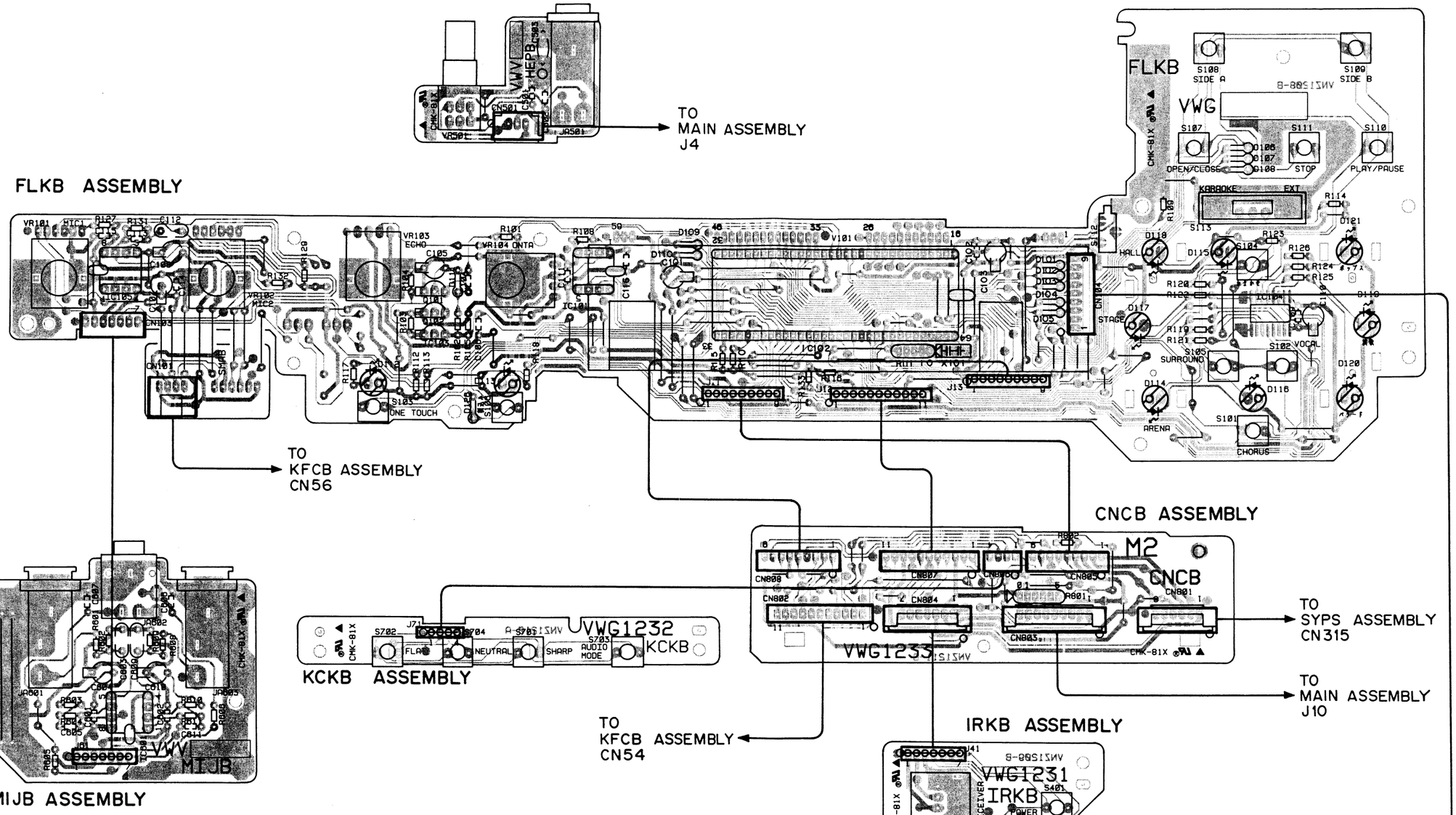
CFD-S250K

- View from component side

HEPB ASSEMBLY

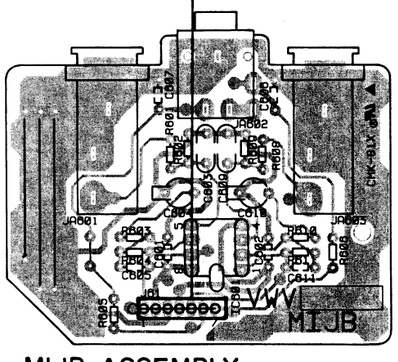
TO
MAIN ASSEMBLY
J4

FLKB ASSEMBLY



TO
KFCB ASSEMBLY
CN56

MIJB ASSEMBLY



KCKB ASSEMBLY

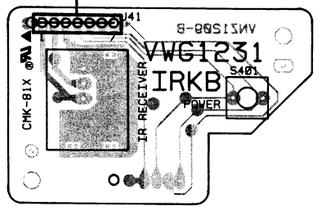
CNCB ASSEMBLY

TO
SYPS ASSEMBLY
CN315

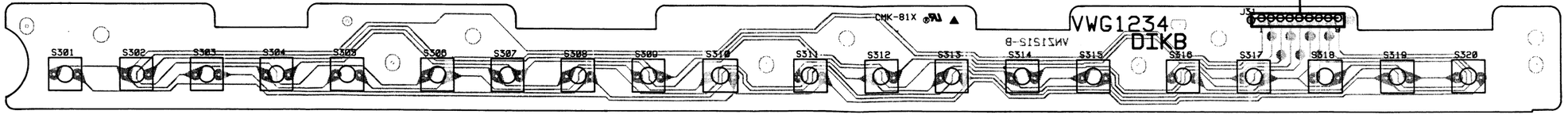
TO
MAIN ASSEMBLY
J10

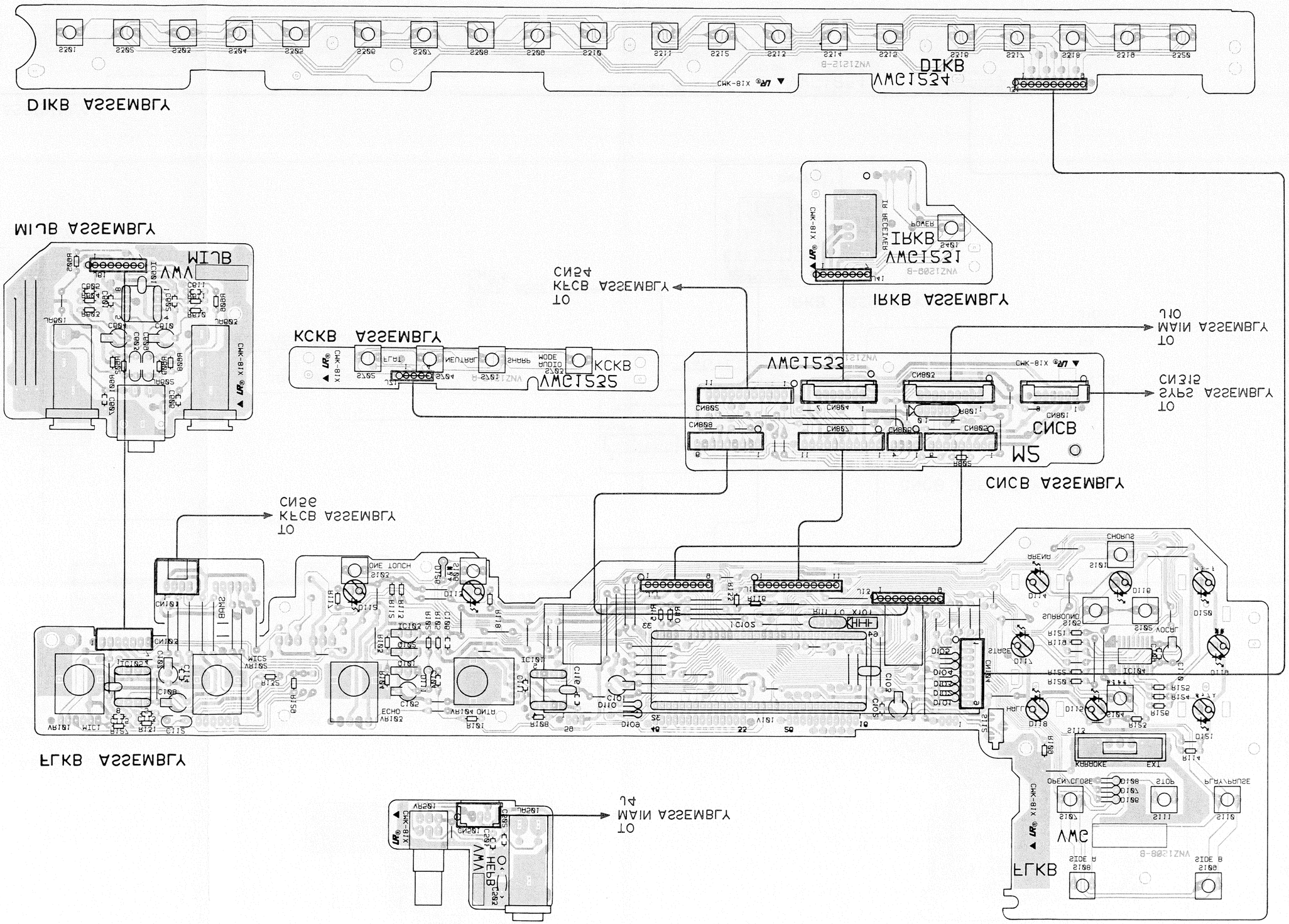
TO
KFCB ASSEMBLY
CN54

IRKB ASSEMBLY



DIKB ASSEMBLY





• View from soldering side

CLD-S280K

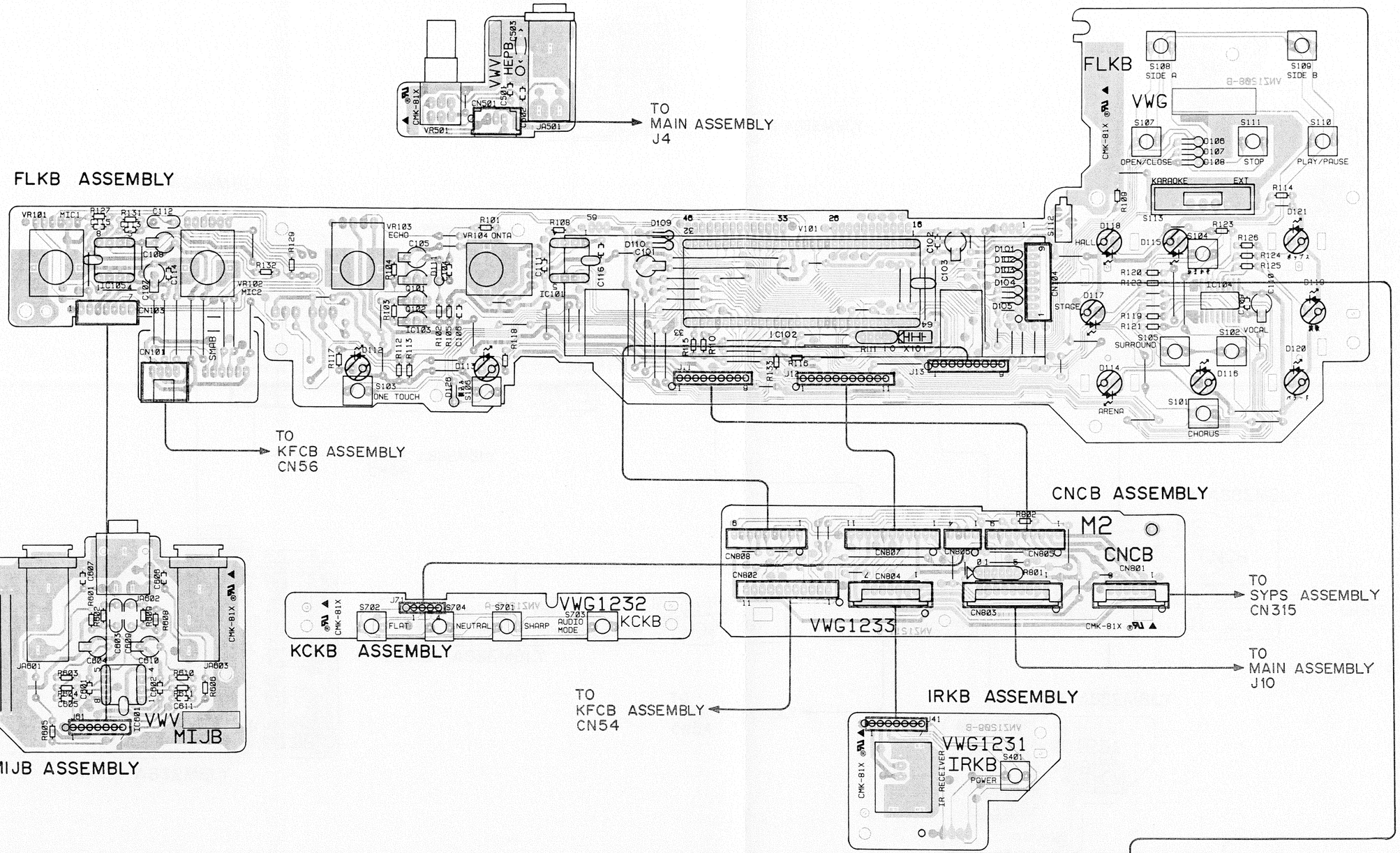
CLD-2590K

- View from component side

HEPB ASSEMBLY

TO
MAIN ASSEMBLY
J4

FLKB ASSEMBLY



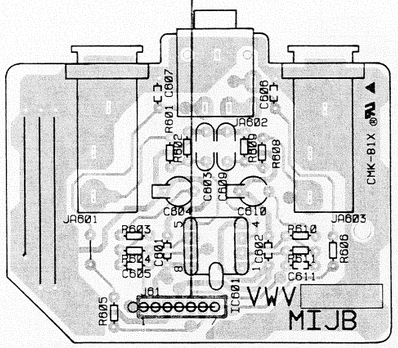
TO
KFCB ASSEMBLY
CN56

CNCB ASSEMBLY

TO
SYPS ASSEMBLY
CN315

TO
MAIN ASSEMBLY
J10

MIJB ASSEMBLY

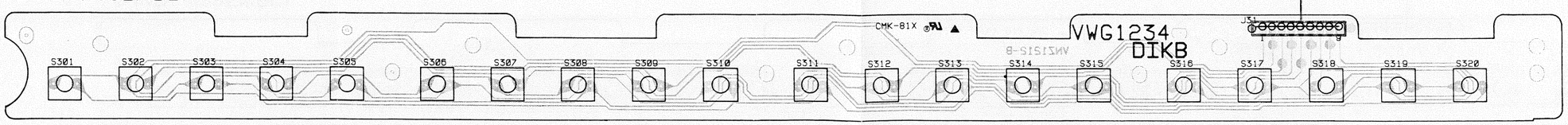


KCKB ASSEMBLY

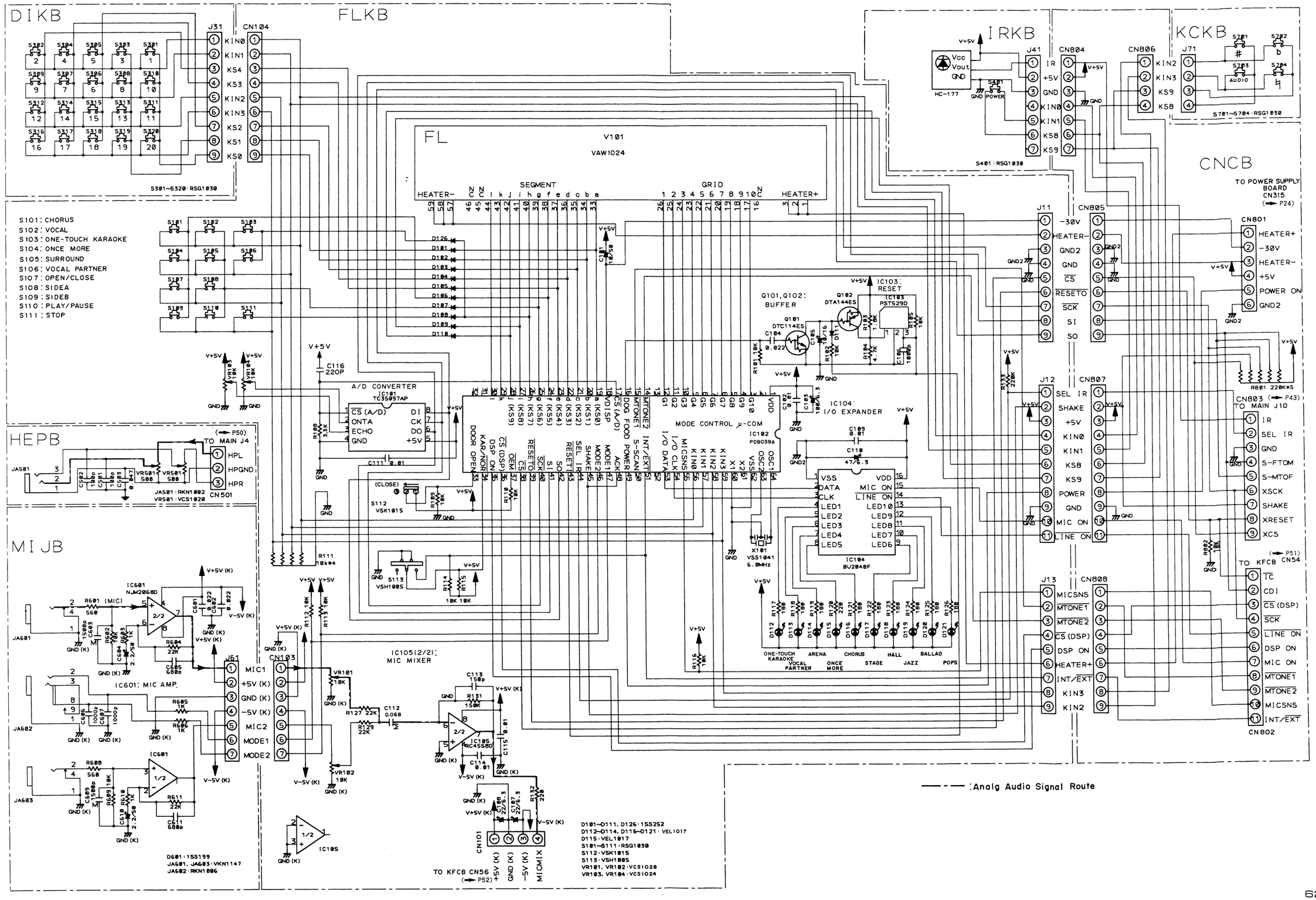
TO
KFCB ASSEMBLY
CN54

IRKB ASSEMBLY

DIKB ASSEMBLY



4.12 FLKB, DIKB, HEPB, MIJB, IRKB, KCKB AND CNCB ASSEMBLY



5. P.C.B's PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)

560 Ω → 56 × 10^1 → 561 ····· RD1/4PS 5 6 1 J

47k Ω → 47 × 10^3 → 473 ····· RD1/4PS 4 7 3 J

0.5 Ω → 0R5 ····· RN2H 0 R 5 K

1 Ω → 010 ····· RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω→562 × 10^1→5621 ····· RN1/4SR 5 6 2 1 F

Mark	No.	Description	Part No.

P.C. BOARDS CONSTRUCTION

⊙	MOTHER ASSEMBLY	VWM1223
	├ MAIN ASSEMBLY	
	├ FG ASSEMBLY	
	└ SW ASSEMBLY	
⊙	KRAB ASSEMBLY	VWM1221
	├ EXTB ASSEMBLY	
	└ KFCB ASSEMBLY	
⊙	FRPB ASSEMBLY	VWM1225
	├ FLKB ASSEMBLY	
	├ IRKB ASSEMBLY	
	├ KCKB ASSEMBLY	
	├ CNCB ASSEMBLY	
	├ DIKB ASSEMBLY	
	├ MIJB ASSEMBLY	
	└ HEPB ASSEMBLY	
⊙	DRVB ASSEMBLY	VWS1087
	POWER SUPPLY BOARD ASSEMBLY	VWR1109
	CNNB ASSEMBLY	
	HEAD ASSEMBLY	

Mark	No.	Description	Part No.

⊙ MOTHER ASSEMBLY (VWM1223)

MOTHER assembly is composed of the MAIN, FG and SW assemblies.

MAIN ASSEMBLY

SEMICONDUCTORS

	IC101 MECHANISM CONT. MCU	PD0081D1
	IC201 EFM DEMODULATION IC	CXD2500AQ
	IC202 IC	BA15218N
	IC203	TC9237N
	IC204 AUDIO IC	LA9410
	IC205 OP-AMP IC	NJM4580L
	IC351	PA0034A
	IC401 VIDEO IC	PA5013A
	IC402 CDD DELAY LINE	PM0001
	IC403 IC	CXL1009P
	IC404	PA0017
	IC405 CHARACTER GENE IC	PD0070
	IC601 TBC IC	PM3002
	IC602, 603 IC	BA15218N
	IC801 PRE AMP IC	CXA1081S
	IC803 FTS IC	PM3003
	IC804 POWER OP AMP	LA6510L
	Q155	DTC124EK
	Q201 CHIP TRANSISTOR	2SC2412K
	Q202 DIGITAL TRANSISTOR	DTA124EK
	Q204, 205 TRANSISTOR	2SD2144S
	Q206	DTC124EK
	Q207 DIGITAL TRANSISTOR	DTA124EK
	Q208	DTC124EK
	Q351 TRANSISTOR	2SC1740S
	Q352 CHIP TRANSISTOR	2SC2412K
	Q405 CHIP TRANSISTOR	2SC2412K
	Q431 TRANSISTOR	2SC1740S
	Q432 CHIP TRANSISTOR	2SC2412K
	Q456 CHIP TRANSISTOR	2SC2412K
	Q457 CHIP TRANSISTOR	2SA1037K
	Q496 CHIP TRANSISTOR	2SA1037K
	Q497-500 CHIP TRANSISTOR	2SC2412K
	Q511 CHIP TRANSISTOR	2SA1037K
	Q541 CHIP TRANSISTOR	2SC2412K
	Q581 CHIP TRANSISTOR	2SA1037K
	Q582, 583 TRANSISTOR	2SC1740S
	Q601	FMW2
	Q602 TRANSISTOR	2SC1740S
	Q603 TRANSISTOR	2SA933S
	Q604 TRANSISTOR	2SC1740S
	Q605 TRANSISTOR	2SA933S
	Q606	DTC124EK
	Q607 CHIP TRANSISTOR	2SC2412K
	Q608 DIGITAL TRANSISTOR	DTA124EK
	Q610 CHIP TRANSISTOR	2SC2412K
	Q802 CHIP TRANSISTOR	2SA1037K
	Q803-805 CHIP TRANSISTOR	2SC2412K
	Q807 CHIP TRANSISTOR	2SC2412K
	Q810 CHIP TRANSISTOR	2SC2412K
	Q811	DTC124EK
	Q812 CHIP TRANSISTOR	2SA1037K
	Q814 CHIP TRANSISTOR	2SC2412K
	Q822 TRANSISTOR	2SD1858X
	Q823	DTC124EK
	Q824 DIGITAL TRANSISTOR	DTA124EK
	Q825 CHIP TRANSISTOR	2SC2412K
	Q826 DIGITAL TRANSISTOR	DTA124EK
	Q827, 828	DTC124EK
	Q829, 830 DIGITAL TRANSISTOR	DTA124EK
	Q831 CHIP TRANSISTOR	2SC2412K
	Q832	DTC124EK
	D102 DIODE	1SS254
	D104 DIODE	1SS254
	D201 VARI-CAP	FC54M
	D202 ZENER DIODE	04AZ10-Y
	D471 DIODE	1SS254
	D601-604 DIODE	1SS254
	D607, 608 DIODE	1SS254
	D609	DA204K
	D802, 803 ZENER DIODE	04AZ2.0-X
	D804-807 DIODE	1SS254

SWITCHES

	S201 SLIDE SWITCH	VSH1007

COILS/TRANSFORMERS

	L101 AXIAL INDUCTOR	LAU470J
	L202-204 AXIAL INDUCTOR	LAU2R2M
	L227 AXIAL INDUCTOR	LAU2R2M
	L351, 352 AXIAL INDUCTOR	LAU560J
	L353 AXIAL INDUCTOR	LAU270J
	L411 AXIAL INDUCTOR	LAU820J
	L412, 413 AXIAL INDUCTOR	LAU220J
	L414, 415 AXIAL INDUCTOR	LAU120J
	L416 RADIAL INDUCTOR	LFA330J
	L431 AXIAL INDUCTOR	LAU470J
	L432 AXIAL INDUCTOR	LAU560J
	L433 AXIAL INDUCTOR	LAU270J
	L456 RADIAL INDUCTOR	LRA221J
	L457 AXIAL INDUCTOR	LAU101J
	L458 RADIAL INDUCTOR	LRA221J
	L459, 460 AXIAL INDUCTOR	LAU2R2M
	L496 AXIAL INDUCTOR	LAU180J
	L497 AXIAL INDUCTOR	LAU181J
	L511 AXIAL INDUCTOR	LAU820J
	L521 AXIAL INDUCTOR	LAU120J
	L522 AXIAL INDUCTOR	LAU560J
	L523 AXIAL INDUCTOR	LAU150J
	L524 RADIAL INDUCTOR	LRA221J
	L525 AXIAL INDUCTOR	LAU470J
	L541 AXIAL INDUCTOR	LAU120J
	L601, 602 AXIAL INDUCTOR	LAU101J
	L603 AXIAL INDUCTOR	LAU470J
	L801 AXIAL INDUCTOR	LAU151J
	L802 AXIAL INDUCTOR	LAU181J
	L803 AXIAL INDUCTOR	LAU151J
	L804 AXIAL INDUCTOR	LAU100J
	F352	VTF1048
	F353	VTF1049

CAPACITORS

	C101 ELECTR. CAPACITOR	CEAS101M10
	C102 CERAMIC CAPACITOR	CKSQYF473Z25
	C103 CHIP CAPACITOR	CKSQYF103Z50
	C104, 105 CHIP CERAMIC C.	CCSQCH300J50
	C106 CHIP CAPACITOR	CKSQYF103Z50
	C122 CHIP CAPACITOR	CKSQYF103Z50
	C201 CERAMIC CAPACITOR	CKSQYF473Z25
	C202	CFTXA152J50
	C203 ELECTR. CAPACITOR	CEAS221M6R3
	C204 CERAMIC CAPACITOR	CKSQYF104Z25
	C205 ELECTR. CAPACITOR	CEANPR47M50
	C206 CHIP CAPACITOR	CKSQYF103Z50
	C208 ELECTR. CAPACITOR	CEAS470M10
	C209 CERAMIC CAPACITOR	CKSQYF104Z25
	C210 CERAMIC CAPACITOR	CKSQYF473Z25
	C211 ELECTR. CAPACITOR	CEAS470M10
	C212 CERAMIC CAPACITOR	CKSQYF104Z25
	C213 CHIP CAPACITOR	CKSQYF103Z50
	C214 CHIP CAPACITOR	CCSQCH050C50
	C225 ELECTR. CAPACITOR	CEANPR47M50
	C226 FILM CAPACITOR	CFTNA223J50
	C227 ELECTR. CAPACITOR	CEAS220M25
	C228, 229 CERAMIC CAPACITOR	CKSQYF104Z25
	C230 ELECTR. CAPACITOR	CEAS470M10
	C231 CHIP CAPACITOR	CKSQYF103Z50
	C232 CERAMIC CAPACITOR	CCSQCH151J50
	C233 CHIP CAPACITOR	CKSQYF103Z50
	C251 CERAMIC CAPACITOR	CKSQYF104Z25
	C253 ELECTR. CAPACITOR	CEAS470M10
	C254, 255 CERAMIC CAPACITOR	CKSQYF104Z25

Mark	No.	Description	Part No.
	C258	ELECTR. CAPACITOR	CEAS470M10
	C259	CERAMIC CAPACITOR	CKSQYF104Z25
	C260, 261	FILM CAPACITOR	CFTNA104J50
	C262, 263	ELECTR. CAPACITOR	CEAS470M10
	C264	CHIP CAPACITOR	CCSQCH121J50
	C266, 267	CERAMIC CAPACITOR	CCSQCH470J50
	C268	CHIP CAPACITOR	CCSQCH121J50
	C270, 271	CERAMIC CAPACITOR	CCSQCH470J50
	C272-277	ELECTR. CAPACITOR	CEAS221M10
	C279, 280	ELECTR. CAPACITOR	CEAS4R7M50
	C281, 282	ELECTR. CAPACITOR	CEANP220M10
	C283-286	CERAMIC CAPACITOR	CCSQSL331J50
	C287, 288	ELECTR. CAPACITOR	CEAS470M16
	C290-293	ELECTR. CAPACITOR	CEJA100M16
	C351	CHIP CAPACITOR	CCSQCH910J50
	C352	CHIP CERAMIC C.	CCSQCH221J50
	C353	CHIP CAPACITOR	CCSQCH910J50
	C354	CHIP CAPACITOR	CKSQYF103Z50
	C355	ELECTR. CAPACITOR	CEAS100M50
	C358, 359	CHIP CAPACITOR	CKSQYF103Z50
	C360	ELECTR. CAPACITOR	CEAS221M6R3
	C361	ELECTR. CAPACITOR	CEAS101M10
	C362	CERAMIC CAPACITOR	CCSQSL331J50
	C363	CHIP CAPACITOR	CKSQYB682K50
	C364	ELECTR. CAPACITOR	CEAS220M25
	C365, 366	CERAMIC CAPACITOR	CKSQYB472K50
	C367	FILM CAPACITOR	CFTNA393J50
	C369	ELECTR. CAPACITOR	CEAS221M6R3
	C370	ELECTR. CAPACITOR	CEAS100M50
	C372, 373	FILM CAPACITOR	CFTNA104J50
	C374	CERAMIC CAPACITOR	CCSQCH560J50
	C375	CHIP CAPACITOR	CKSQYF103Z50
	C376	ELECTR. CAPACITOR	CEAS221M6R3
	C377	CHIP CAPACITOR	CKSQYF103Z50
	C378	ELECTR. CAPACITOR	CEAS221M6R3
	C379	ELECTR. CAPACITOR	CEAS101M10
	C380	CHIP CERAMIC C.	CCSQCH271J50
	C381	CERAMIC CAPACITOR	CCSQCH560J50
	C382	CHIP CAPACITOR	CKSQYB682K50
	C383	ELECTR. CAPACITOR	CEAS220M25
	C384, 385	CERAMIC CAPACITOR	CKSQYB472K50
	C387	FILM CAPACITOR	CFTNA393J50
	C388	ELECTR. CAPACITOR	CEASR47M50
	C395	ELECTR. CAPACITOR	CEAS220M25
	C401, 402	ELECTR. CAPACITOR	CEAS101M10
	C403	CERAMIC CAPACITOR	CGCYX473K25
	C404	CERAMIC CAPACITOR	CKSQYF104Z25
	C405, 406	ELECTR. CAPACITOR	CEAS470M10
	C407, 408	CERAMIC CAPACITOR	CKSQYF473Z25
	C411, 412	CERAMIC CAPACITOR	CCSQCH470J50
	C413	CERAMIC CAPACITOR	CCSQCH151J50
	C414	CHIP CERAMIC C.	CCSQCH221J50
	C415	CHIP CAPACITOR	CCSQCH100D50
	C416	CHIP CAPACITOR	CCSQCH330J50
	C417	CHIP CAPACITOR	CCSQCH050C50
	C418	CHIP CAPACITOR	CKSQYF103Z50
	C421, 422	CERAMIC CAPACITOR	CCSQCH470J50
	C423, 424	CHIP CERAMIC C.	CCSQCH200J50
	C425, 426	CHIP CAPACITOR	CKSQYF103Z50
	C427	CERAMIC CAPACITOR	CKSQYF104Z25
	C428	ELECTR. CAPACITOR	CEAS471M6R3
	C429	CERAMIC CAPACITOR	CKSQYF104Z25
	C431, 432	CERAMIC CAPACITOR	CKSQYF473Z25
	C433	CERAMIC CAPACITOR	CCSQCH390J50
	C434	ELECTR. CAPACITOR	CEAS101M10
	C435	CERAMIC CAPACITOR	CKSQYF104Z25
	C436	ELECTR. CAPACITOR	CEAS010M50
	C437	CERAMIC CAPACITOR	CCSQCH270J50
	C438	CERAMIC CAPACITOR	CCSQCH120J50
	C439	CHIP CAPACITOR	CCSQCH330J50
	C441	CHIP CAPACITOR	CCSQCH100D50
	C442	CERAMIC CAPACITOR	CKSQYF104Z25
	C443	ELECTR. CAPACITOR	CEAS4R7M50
	C444	MYLOR FILM CAPACITOR	CQMA272J50
	C445	ELECTR. CAPACITOR	CEAS101M10
	C446	FILM CAPACITOR	CFTNA103J50
	C447	CHIP CAPACITOR	CCSQCH330J50
	C448, 449	CERAMIC CAPACITOR	CKSQYF473Z25
	C450	CHIP CAPACITOR	CCSQCH100D50
	C451	CERAMIC CAPACITOR	CCSQCH270J50
	C452	CHIP CAPACITOR	CCSQCH100D50
	C453-455	CHIP CAPACITOR	CCSQCH330J50
	C456	CHIP CERAMIC C.	CCSQCH221J50
	C457	ELECTR. CAPACITOR	CEAS101M10
	C458-460	CHIP CAPACITOR	CKSQYF103Z50
	C461	CHIP CAPACITOR	CCSQCH101J50
	C462	CHIP CAPACITOR	CCSQCH330J50
	C463	CHIP CERAMIC C.	CCSQCH221J50
	C464, 465	ELECTR. CAPACITOR	CEAS470M10
	C466	CERAMIC CAPACITOR	CKSQYF473Z25
	C467	CERAMIC CAPACITOR	CGCYX473K25
	C471	ELECTR. CAPACITOR	CEANP010M50
	C472	ELECTR. CAPACITOR	CEAS4R7M50
	C473	CERAMIC CAPACITOR	CKSQYF473Z25
	C474	AUDIO FILM CAPACITOR	CFTXA223J50
	C475, 476	ELECTR. CAPACITOR	CEAS4R7M50
	C477, 478	CERAMIC CAPACITOR	CKSQYF473Z25
	C479, 480	CERAMIC CAPACITOR	CKSQYF104Z25
	C481, 482	ELECTR. CAPACITOR	CEAS101M10
	C483	CERAMIC CAPACITOR	CKSQYF473Z25
	C484	ELECTR. CAPACITOR	CEAS470M10
	C485	CHIP CERAMIC C.	CCSQCH220J50
	C486	CHIP CAPACITOR	CKSQYF103Z50
	C487, 488	CERAMIC CAPACITOR	CKSQYF473Z25
	C489, 490	ELECTR. CAPACITOR	CEAS470M10
	C496	CERAMIC CAPACITOR	CCSQCH330J50
	C497	CHIP CAPACITOR	CCSQCH100D50
	C498	CERAMIC CAPACITOR	CCSQCH820J50
	C499	ELECTR. CAPACITOR	CEAS470M10
	C500	CHIP CAPACITOR	CCSQCH100D50

Mark	No.	Description	Part No.
	C501, 502	ELECTR. CAPACITOR	CEAS470M10
	C503	CERAMIC CAPACITOR	CKSQYF104Z25
	C504	CERAMIC CAPACITOR	CKSQYF473Z25
	C505, 506	CERAMIC CAPACITOR	CKSQYF104Z25
	C507	CERAMIC CAPACITOR	CKSQYF473Z25
	C508	CERAMIC CAPACITOR	CKSQYF104Z25
	C509	CERAMIC CAPACITOR	CCSQCH151J50
	C510	CERAMIC CAPACITOR	CCSQCH270J50
	C511	CERAMIC CAPACITOR	CKSQYF104Z25
	C512	ELECTR. CAPACITOR	CEAS470M10
	C513	CERAMIC CAPACITOR	CKSQYF104Z25
	C514	FILM CAPACITOR	CFTNA104J50
	C515	FILM CAPACITOR	CFTNA683J50
	C516	CHIP CERAMIC C.	CCSQCH220J50
	C517	FILM CAPACITOR	CFTNA683J50
	C518	ELECTR. CAPACITOR	CEAS010M50
	C521	ELECTR. CAPACITOR	CEAS470M10
	C522	ELECTR. CAPACITOR	CEAS100M50
	C523	CHIP CAPACITOR	CKSQYB102K50
	C524	CERAMIC CAPACITOR	CCSQCH390J50
	C525	ELECTR. CAPACITOR	CEAS471M6R3
	C526	CERAMIC CAPACITOR	CKSQYF104Z25
	C527	CERAMIC CAPACITOR	CKSQYF473Z25
	C528	CERAMIC CAPACITOR	CCSQCH470J50
	C529	CERAMIC CAPACITOR	CCSQCH151J50
	C530	FILM CAPACITOR	CFTNA184J50
	C531	CERAMIC CAPACITOR	CKSQYF104Z25
	C532	CERAMIC CAPACITOR	CKSQYF473Z25
	C533	ELECTR. CAPACITOR	CEAS470M10
	C534	CERAMIC CAPACITOR	CKSQYF473Z25
	C535	CHIP CAPACITOR	CKSQYF103Z50
	C536	CERAMIC CAPACITOR	CCSQCH470J50
	C537	CHIP CAPACITOR	CCSQCH100D50
	C538	CERAMIC CAPACITOR	CGCYX473K25
	C541	CERAMIC CAPACITOR	CKSQYF104Z25
	C542	ELECTR. CAPACITOR	CEAS470M10
	C543	CERAMIC CAPACITOR	CKSQYF104Z25
	C544	CERAMIC CAPACITOR	CKSQYF473Z25
	C545	CHIP CAPACITOR	CCSQCH680J50
	C546	CERAMIC CAPACITOR	CCSQCH470J50
	C547, 548	CERAMIC CAPACITOR	CKSQYF473Z25
	C565, 566	ELECTR. CAPACITOR	CEAS101M10
	C567	CERAMIC CAPACITOR	CKSQYF473Z25
	C581	CERAMIC CAPACITOR	CKSQYF473Z25
	C582, 583	ELECTR. CAPACITOR	CEAS470M10
	C584, 585	CERAMIC CAPACITOR	CKSQYF104Z25
	C586	CHIP CAPACITOR	CCSQCH101J50
	C601	ELECTR. CAPACITOR	CEAS221M6R3
	C602	CERAMIC CAPACITOR	CKSQYF473Z25
	C603	CHIP CAPACITOR	CCSQSL471J50
	C604	AUDIO FILM CAPACITOR	CFTXA224J50
	C605-607		CFTXA102J50
	C608		CFTXA152J50
	C610	FILM CAPACITOR	CFTNA563J50
	C611	MYLOR FILM CAPACITOR	CQMA272J50

Mark	No.	Description	Part No.
	C612	ELECTR. CAPACITOR	CEAS220M25
	C613	MYLOR FILM CAPACITOR	CQMA332J50
	C614	FILM CAPACITOR	CFTNA103J50
	C615	FILM CAPACITOR	CFTNA104J50
	C616	ELECTR. CAPACITOR	CEANP2R2M50
	C617	FILM CAPACITOR	CFTNA223J50
	C618	ELECTR. CAPACITOR	CEANP220M10
	C619	MYLOR FILM CAPACITOR	CQMA332J50
	C620	MYLOR FILM CAPACITOR	CQMA222J50
	C621	ELECTR. CAPACITOR	CEAS4R7M50
	C622	ELECTR. CAPACITOR	CEAS470M10
	C623	CERAMIC CAPACITOR	CKSQYF473Z25
	C624-627	CHIP CAPACITOR	CCSQCH180J50
	C628	CHIP CAPACITOR	CKSQYF103Z50
	C629	CHIP CAPACITOR	CCSQCH180J50
	C630	CHIP CAPACITOR	CKSQYF103Z50
	C631	CERAMIC CAPACITOR	CCSQSL331J50
	C641, 642	ELECTR. CAPACITOR	CEAS470M10
	C643-646	CHIP CAPACITOR	CKSQYF103Z50
	C650-653	CHIP CAPACITOR	CKSQYF103Z50
	C654	CERAMIC CAPACITOR	CCSQCH820J50
	C655	CHIP CAPACITOR	CCSQCH180J50
	C656, 657	MYLOR FILM CAPACITOR	CQMA272J50
	C658	CHIP CAPACITOR	CCSQCH101J50
	C659	CHIP CAPACITOR	CCSQCH180J50
	C803	CHIP CAPACITOR	CKSQYF103Z50
	C804	CHIP CAPACITOR	CCSQCH680J50
	C805	CHIP CAPACITOR	CKSQYF103Z50
	C807	ELECTR. CAPACITOR	CEANP010M50
	C808	ELECTR. CAPACITOR	CEAL010M50
	C809	CHIP CAPACITOR	CCSQCH680J50
	C810, 811	CHIP CAPACITOR	CCSQCH101J50
	C812	CERAMIC CAPACITOR	CCSQCH270J50
	C813	CHIP CAPACITOR	CCSQCH680J50
	C814	ELECTR. CAPACITOR	CEAL010M50
	C815	CERAMIC CAPACITOR	CCSQCH270J50
	C816	ELECTR. CAPACITOR	CEAL010M50
	C817	CHIP CAPACITOR	CCSQCH050C50
	C818	CHIP CAPACITOR	CCSQSL471J50
	C819	CHIP CAPACITOR	CCSQSL561J50
	C820, 821	CERAMIC CAPACITOR	CKSQYF473Z25
	C822	CHIP CAPACITOR	CCSQCH101J50
	C823	ELECTR. CAPACITOR	CEAS220M25
	C824	FILM CAPACITOR	CFTNA103J50
	C825	AUDIO FILM CAPACITOR	CFTXA682J50
	C827	FILM CAPACITOR	CFTNA333J50
	C841	ELECTR. CAPACITOR	CEAS220M25
	C842	ELECTR. CAPACITOR	CEANP100M16
	C843	FILM CAPACITOR	CFTNA223J50
	C844	CERAMIC CAPACITOR	CCSQSL331J50
	C845	ELECTR. CAPACITOR	CEANP010M50
	C846	CERAMIC CAPACITOR	CCSQSL331J50
	C847	FILM CAPACITOR	CFTNA683J50
	C848	FILM CAPACITOR	CFTNA473J50
	C849	FILM CAPACITOR	CFTNA103J50

Mark	No.	Description	Part No.
	C850	ELECTR. CAPACITOR	CEANP2R2M50
	C851	CERAMIC CAPACITOR	CKSQYF104Z25
	C853	MYLOR FILM CAPACITOR	CQMA332J50
	C854	CERAMIC CAPACITOR	CKSQYB821K50
	C855	ELECTR. CAPACITOR	CEAS100M50
	C856	CHIP CAPACITOR	CKSQYF103Z50
	C857	ELECTR. CAPACITOR	CEAS470M10
	C858	CHIP CAPACITOR	CKSQYF103Z50
	C859	ELECTR. CAPACITOR	CEAS470M10
	C860	CHIP CAPACITOR	CKSQYF103Z50
	C861	FILM CAPACITOR	CFTNA103J50
	C862	ELECTR. CAPACITOR	CEAS100M50
	C863	ELECTR. CAPACITOR	CEANP100M16
	C864	ELECTR. CAPACITOR	CEAS100M50
	C865	FILM CAPACITOR	CFTNA103J50
	C866	ELECTR. CAPACITOR	CEANPR47M50
	C867	FILM CAPACITOR	CFTNA333J50
	C868	FILM CAPACITOR	CFTNA683J50
	C869	FILM CAPACITOR	CFTNA473J50
	C870	ELECTR. CAPACITOR	CEANP220M10
	C871	CHIP CERAMIC C.	CCSQCH221J50
	C873	FILM CAPACITOR	CFTNA103J50
	C874	FILM CAPACITOR	CFTNA104J50
	C875	CHIP CAPACITOR	CKSQYB102K50
	C876, 877	ELECTR. CAPACITOR	CEAS220M25
	C878-880	CERAMIC CAPACITOR	CKSQYF473Z25
	C881, 882	CERAMIC CAPACITOR	CKSQYF104Z25
	C883	AUDIO FILM CAPACITOR	CFTXA124J50
	C884	CHIP CAPACITOR	CCSQCH330J50
	C899	CHIP CAPACITOR	CCSQCH050C50
	C929	CHIP CAPACITOR	CCSQCH330J50
	C931, 932	ELECTR. CAPACITOR	CEAL220M35
	C933-935	CHIP CAPACITOR	CKSQYF103Z50
RESISTORS			
	R101-104	CHIP RESISTOR	RS1/10S□□□J
	R105	CARBONFILM RESISTOR	RD1/6PM□□□J
	R106-108	CHIP RESISTOR	RS1/10S□□□J
	R110-115	CHIP RESISTOR	RS1/10S□□□J
	R117-122	CHIP RESISTOR	RS1/10S□□□J
	R123	CARBONFILM RESISTOR	RD1/6PM□□□J
	R124	CHIP RESISTOR	RS1/10S□□□J
	R130	CHIP RESISTOR	RS1/10S□□□J
	R132	CHIP RESISTOR	RS1/10S□□□J
	R140-142	CHIP RESISTOR	RS1/10S□□□J
	R150, 151	CHIP RESISTOR	RS1/10S□□□J
	R180	CHIP RESISTOR	RS1/10S□□□J
	R183, 184	CHIP RESISTOR	RS1/10S□□□J
	R201-205	CHIP RESISTOR	RS1/10S□□□J
	R207-210	CHIP RESISTOR	RS1/10S□□□J
	R218	CHIP RESISTOR	RS1/10S□□□J
	R222-233	CHIP RESISTOR	RS1/10S□□□J
	R235	CHIP RESISTOR	RS1/10S□□□J
	R238	CHIP RESISTOR	RS1/10S□□□J
	R240, 241	CHIP RESISTOR	RS1/10S□□□J

Mark	No.	Description	Part No.
	R251, 252	CHIP RESISTOR	RS1/10S□□□J
	R253, 254	CARBONFILM RESISTOR	RD1/6PM□□□J
	R256	CHIP RESISTOR	RS1/10S□□□J
	R258-260	CHIP RESISTOR	RS1/10S□□□J
	R261, 262	CARBONFILM RESISTOR	RD1/6PM□□□J
	R264	CHIP RESISTOR	RS1/10S□□□J
	R266	CHIP RESISTOR	RS1/10S□□□J
	R267, 268	CARBONFILM RESISTOR	RD1/6PM□□□J
	R269-288	CHIP RESISTOR	RS1/10S□□□J
	R289, 290	CARBONFILM RESISTOR	RD1/6PM□□□J
	R294-297	CARBONFILM RESISTOR	RD1/6PM□□□J
	R301	CHIP RESISTOR	RS1/10S□□□J
	R309		RS1/10S□□□J
	R351-356	CHIP RESISTOR	RS1/10S□□□J
	R357	CARBONFILM RESISTOR	RD1/6PM□□□J
	R358	CHIP RESISTOR	RS1/10S□□□J
	R360-380	CHIP RESISTOR	RS1/10S□□□J
	R381	CARBONFILM RESISTOR	RD1/6PM□□□J
	R385	CHIP RESISTOR	RS1/10S□□□J
	R406, 407	CHIP RESISTOR	RS1/10S□□□J
	R411-413	CHIP RESISTOR	RS1/10S□□□J
	R415, 416	METALFILM RESISTOR	RN1/6PQ□□□□F
	R431	CARBONFILM RESISTOR	RD1/6PM□□□J
	R432	CHIP RESISTOR	RS1/10S□□□J
	R434	METALFILM RESISTOR	RN1/6PQ□□□□F
	R435-437	CHIP RESISTOR	RS1/10S□□□J
	R438	METALFILM RESISTOR	RN1/6PQ□□□□F
	R439-441	CHIP RESISTOR	RS1/10S□□□J
	R442	CARBONFILM RESISTOR	RD1/6PM□□□J
	R443	CHIP RESISTOR	RS1/10S□□□J
	R456-459	CHIP RESISTOR	RS1/10S□□□J
	R471-476	CHIP RESISTOR	RS1/10S□□□J
	R496-504	CHIP RESISTOR	RS1/10S□□□J
	R506-508	CHIP RESISTOR	RS1/10S□□□J
	R511	METALFILM RESISTOR	RN1/6PQ□□□□F
	R512-519	CHIP RESISTOR	RS1/10S□□□J
	R521-532	CHIP RESISTOR	RS1/10S□□□J
	R534	CHIP RESISTOR	RS1/10S□□□J
	R542, 543	CHIP RESISTOR	RS1/10S□□□J
	R544	CARBONFILM RESISTOR	RD1/6PM□□□J
	R581-584	CHIP RESISTOR	RS1/10S□□□J
	R585	CARBONFILM RESISTOR	RD1/6PM□□□J
	R586, 587		RS1/10S□□□J
	R589	CARBONFILM RESISTOR	RD1/6PM□□□J
	R601-612		RS1/10S□□□J
	R615-623	CHIP RESISTOR	RS1/10S□□□J
	R625-646	CHIP RESISTOR	RS1/10S□□□J
	R647	CARBONFILM RESISTOR	RD1/6PM□□□J
	R648-654	CHIP RESISTOR	RS1/10S□□□J
	R661, 662	CHIP RESISTOR	RS1/10S□□□J
	R665-678	CARBONFILM RESISTOR	RD1/6PM□□□J
	R680-683	METALFILM RESISTOR	RN1/6PQ□□□□F
	R684-693	CHIP RESISTOR	RS1/10S□□□J
	R700, 701	CHIP RESISTOR	RS1/10S□□□J
	R713		RS1/10S□□□J

Mark	No.	Description	Part No.
	R803-806	CHIP RESISTOR	RS1/10S□□□J
	R808-812	CHIP RESISTOR	RS1/10S□□□J
	R813	CARBONFILM RESISTOR	RD1/6PM□□□J
	R814, 815	CHIP RESISTOR	RS1/10S□□□J
	R818-829	CHIP RESISTOR	RS1/10S□□□J
	R832, 833	CARBONFILM RESISTOR	RD1/6PM□□□J
	R834-848	CHIP RESISTOR	RS1/10S□□□J
	R856	CHIP RESISTOR	RS1/10S□□□J
	R859, 860	CHIP RESISTOR	RS1/10S□□□J
	R871	CHIP RESISTOR	RS1/10S□□□J
	R873	CARBONFILM RESISTOR	RD1/6PM□□□J
	R875, 876	CHIP RESISTOR	RS1/10S□□□J
	R878-886	CHIP RESISTOR	RS1/10S□□□J
	R888-909	CHIP RESISTOR	RS1/10S□□□J
	R910-913	CARBONFILM RESISTOR	RD1/6PM□□□J
	R914-917	CHIP RESISTOR	RS1/10S□□□J
	R918	CARBONFILM RESISTOR	RD1/6PM□□□J
	R919-922	CHIP RESISTOR	RS1/10S□□□J
	R923	CARBONFILM RESISTOR	RD1/6PM□□□J
	R925-932	CHIP RESISTOR	RS1/10S□□□J
	R934	CARBONFILM RESISTOR	RD1/6PM□□□J
	R935-938	CHIP RESISTOR	RS1/10S□□□J
	R940, 941		RS1/10S□□□J
	R942	CARBONFILM RESISTOR	RD1/6PM□□□J
	R943-945		RS1/10S□□□J
	R946	CARBONFILM RESISTOR	RD1/6PM□□□J
	R947-950		RS1/10S□□□J
	R951	CARBONFILM RESISTOR	RD1/6PM□□□J
	R953	CHIP RESISTOR	RS1/10S□□□J
	R955, 956	CHIP RESISTOR	RS1/10S□□□J
	R984, 985	CARBONFILM RESISTOR	RD1/6PM□□□J
	R991	CHIP RESISTOR	RS1/10S□□□J
	R993-995	CHIP RESISTOR	RS1/10S□□□J
	VR441	SEMI-FIXED RESISTOR	VRTB6VS103
	VR481	SEMI-FIXED RESISTOR	VRTB6VS103
	VR482	VR	VRTB6VS472
	VR521	VR	VRTB6VS472
	VR601	VR	VRTB6VS222
	VR602, 603	SEMI-FIXED RESISTOR	VRTB6VS103
	VR604-606	VR	VRTB6VS472
	VR607	VR	VRTB6VS473
	VR608	VARIABLE RESISTOR	VRTB6VS333
	VR609	VR	VRTB6VS472
OTHERS			
	CN103		VKN1137
	CN121		B5P-SHF-1AA
	JA2	JACK	VKN-183
	VC901	VARIABLE CAPACITOR	VCM-008
	X101	CERAMIC RESONATOR	VSS1040
	X201	CRYSTAL RESONATOR	VSS1049
	X601	CRYSTAL RESONATOR	VSS1026
	JA4	JACK	VKB1035

Mark	No.	Description	Part No.
FG ASSEMBLY			
OTHERS			
	D		GP1S51
SW ASSEMBLY			
SWITCHES			
	S101-103	PUSH SWITCH	DSG1015
⊙ KRAB ASSEMBLY (VWM1221)			
KRAB assembly is composed of the EXTB and KFCB assemblies.			
EXTB ASSEMBLY			
CAPACITORS			
	C301, 302	CERAMIC CAPACITOR	CKPUYB331K50
OTHERS			
	JA301	JACK	VKB1022
KFCB ASSEMBLY			
SEMICONDUCTORS			
	IC1	REGULATOR IC	NJM78M08FA
	IC2	REGULATOR IC	NJM79M08FA
	IC3	OP-AMP IC	RC4558D
	IC4	LOGIC IC	BU4053B
	IC5-8	OP-AMP IC	RC4558D
	IC9		YSS205
	IC10		HM65256BLP-10
	IC11		UPD6376CX
	IC12-14	OP-AMP IC	NJM4580D
	IC15	LOGIC IC	MC14066BCP
	IC16, 17	OP-AMP IC	RC4558D
	IC18	HEX INVERTER	TC74HCU04AF
	Q1	TRANSISTOR	DTC124ES
	Q2, 3	TRANSISTOR	2SD2144S
	Q4	TRANSISTOR	DTA124ES
	Q5	TRANSISTOR	DTC124ES
	Q6, 7	TRANSISTOR	DTA124ES
	Q8	TRANSISTOR	2SD2144S
	Q9	TRANSISTOR	DTC124ES
	D1, 2	DIODE	1SS254
	D4	ZENER DIODE	04AZ5.1-X
	D5, 6	DIODE	1SS254
	D7, 8	ZENER DIODE	MTZJ5.6B
	D9	DIODE	1SS254
COILS/TRANSFORMERS			
	L1	RADIAL INDUCTOR	LFA100K
	L2, 3	AXIAL INDUCTOR	LAU100J
CAPACITORS			
	C1, 2	ELECTR. CAPACITOR	CEAS221M25
	C3, 4	ELECTR. CAPACITOR	CEJA470M16
	C5	ELECTR. CAPACITOR	CEJA101M6R3
	C6	CERAMIC CAPACITOR	CKPUYY103N16
	C7, 8	ELECTR. CAPACITOR	CEJANP010M50

Mark	No.	Description	Part No.
	C9-12	CERAMIC CAPACITOR	CKPUYY103N16
	C13	FILM CAPACITOR	CFTNA104J50
	C14	MYLOR FILM CAPACITOR	CQMA472J50
	C16	MYLOR FILM CAPACITOR	CQMA183J50
	C17	FILM CAPACITOR	CFTNA104J50
	C18	CERAMIC CAPACITOR	CKCYB821K50
	C19, 20	CERAMIC CAPACITOR	CKPUYY103N16
	C21	ELECTR. CAPACITOR	CEJA4R7M35
	C22	MYLOR FILM CAPACITOR	CQMA223J50
	C23	MYLOR FILM CAPACITOR	CQMA393J50
	C24	MYLOR FILM CAPACITOR	CQMA242J50
	C25	MYLOR FILM CAPACITOR	CQMA333J50
	C26	MYLOR FILM CAPACITOR	CQMA122J50
	C27	FILM CAPACITOR	CFTNA823J50
	C28	CERAMIC CAPACITOR	CKPUYB331K50
	C29	ELECTR. CAPACITOR	CEJA4R7M35
	C30	MYLOR FILM CAPACITOR	CQMA223J50
	C31	MYLOR FILM CAPACITOR	CQMA393J50
	C32	MYLOR FILM CAPACITOR	CQMA242J50
	C33, 34	CERAMIC CAPACITOR	CKPUYY103N16
	C35	MYLOR FILM CAPACITOR	CQMA333J50
	C36	MYLOR FILM CAPACITOR	CQMA122J50
	C37, 38	CERAMIC CAPACITOR	CKPUYY103N16
	C39	FILM CAPACITOR	CFTNA823J50
	C40	CERAMIC CAPACITOR	CKPUYB331K50
	C41, 42	CERAMIC CAPACITOR	CKPUYY103N16
	C43	ELECTR. CAPACITOR	CEJA4R7M35
	C44, 45	ELECTR. CAPACITOR	CEJA101M6R3
	C46-48	MYLOR FILM CAPACITOR	CQMA332J50
	C49	ELECTR. CAPACITOR	CEJA101M6R3
	C50-52	CERAMIC CAPACITOR	CKPUYY103N16
	C56	CERAMIC CAPACITOR	CKPUYY103N16
	C57	ELECTR. CAPACITOR	CEJA101M6R3
	C58	FILM CAPACITOR	CFTNA104J50
	C60	ELECTR. CAPACITOR	CEJA4R7M35
	C61	MYLOR FILM CAPACITOR	CQMA183J50
	C62	MYLOR FILM CAPACITOR	CQMA333J50
	C63	MYLOR FILM CAPACITOR	CQMA222J50
	C64	MYLOR FILM CAPACITOR	CQMA273J50
	C65	MYLOR FILM CAPACITOR	CQMA122J50
	C66	FILM CAPACITOR	CFTNA823J50
	C67	AXIAL CAPACITOR	CKPUYB271K50
	C71	ELECTR. CAPACITOR	CEJA4R7M35
	C72	MYLOR FILM CAPACITOR	CQMA183J50
	C73	MYLOR FILM CAPACITOR	CQMA333J50
	C74	MYLOR FILM CAPACITOR	CQMA222J50
	C75, 76	CERAMIC CAPACITOR	CKPUYY103N16
	C77	MYLOR FILM CAPACITOR	CQMA273J50
	C78	MYLOR FILM CAPACITOR	CQMA122J50
	C79, 80	CERAMIC CAPACITOR	CKPUYY103N16
	C81	FILM CAPACITOR	CFTNA823J50
	C82	AXIAL CAPACITOR	CKPUYB271K50
	C83-86	CERAMIC CAPACITOR	CKPUYY103N16
	C87, 88	AXIAL CERAMIC C.	CCPUSL220J50
	C89, 90	CERAMIC CAPACITOR	CKPUYY103N16
	C97, 98	CERAMIC CAPACITOR	CKPUYY103N16
	C99, 100	ELECTR. CAPACITOR	CEJA100M16
	C101	CERAMIC CAPACITOR	CKPUYB121K50
	C102	MYLOR FILM CAPACITOR	CQMA822J50
	C103, 104	CERAMIC CAPACITOR	CKPUYY103N16
	C105, 106	ELECTR. CAPACITOR	CEJA470M6R3
	C107, 108	ELECTR. CAPACITOR	CEJANP100M10
	C109, 110	ELECTR. CAPACITOR	CEJA100M16
	C111	CERAMIC CAPACITOR	CKPUYY103N16
	C112-114	ELECTR. CAPACITOR	CEJANP100M10
	C116	CERAMIC CAPACITOR	CKPUYY103N16
RESISTORS			
	R3-12	CARBONFILM RESISTOR	RD1/6PM□□□J
	R15-48	CARBONFILM RESISTOR	RD1/6PM□□□J
	R51-79	CARBONFILM RESISTOR	RD1/6PM□□□J
	R99-116	CARBONFILM RESISTOR	RD1/6PM□□□J
	R117, 118	FUSE RESISTOR	DCN1002
	R120, 121	CARBONFILM RESISTOR	RD1/6PM□□□J

⊙ FRPB ASSEMBLY (VWM1225)

FRPB assembly is composed of the FLKB, IRKB, KCKB, CNCB, DIKB, MIJB and HEPB assemblies.

FLKB ASSEMBLY

SEMICONDUCTORS

IC101	IC	TC35097AP
IC102	MODE CONTROL MCU	PDB039A
IC103	RESET IC	PST529D
IC104	I/O EXPANDER IC	BU2040F
IC105	OP-AMP IC	RC4558D
Q101	TRANSISTOR	DTC114ES
Q102	TRANSISTOR	DTA144ES
D101-111	DIODE	1SS252
D112-121	LED	VEL1017
D126	DIODE	1SS252

SWITCHES

S101-111	SWITCH	RSG1030
S112	DOOR SWITCH	VSK1015
S113	SLIDE SWITCH	VSH1005

CAPACITORS

C101	ELECTR. CAPACITOR	CEJA100M50
C102	CERAMIC CAPACITOR	CKPUYY103N16
C103	ELECTR. CAPACITOR	CEJA101M6R3
C104	CERAMIC CAPACITOR	CKPUYF223Z25
C105	ELECTR. CAPACITOR	CEJA100M16
C106	CERAMIC CAPACITOR	CKPUYB102K50
C107, 108	ELECTR. CAPACITOR	CEJA220M6R3
C109	CERAMIC CAPACITOR	CKPUYY103N16
C110	ELECTR. CAPACITOR	CEJA470M6R3
C111	CERAMIC CAPACITOR	CKPUYY103N16
C112	FILM CAPACITOR	CFTNA683J50
C113	CERAMIC CAPACITOR	CKPUYB151K50
C114, 115	CERAMIC CAPACITOR	CKPUYY103N16
C116	AXIAL CAPACITOR	CKPUYB221K50

Mark	No.	Description	Part No.
RESISTORS			
	R101-105	CARBONFILM RESISTOR	RD1/6PM□□□J
	R108-110	CARBONFILM RESISTOR	RD1/6PM□□□J
	R111	RESISTOR ARRAY (10K)	RA4T□□□J
	R112-127	CARBONFILM RESISTOR	RD1/6PM□□□J
	R129	CARBONFILM RESISTOR	RD1/6PM□□□J
	R131-133	CARBONFILM RESISTOR	RD1/6PM□□□J
	VR101, 102	ROTARY VR	VCS1028
	VR103, 104	ROTARY VR	VCS1024
OTHERS			
			VEB1159
	CN103		BTMK07S-1S
	CN104		BTMK09S-1S
	V101	FL TUBE	VAW1024
	X101	CERAMIC RESONATOR	VSS1041

IRKB ASSEMBLY

Mark	No.	Description	Part No.
SWITCHES			
	S401	SWITCH	RSG1030
OTHERS			
	REMOTE SENSOR		HC-177

KCKB ASSEMBLY

Mark	No.	Description	Part No.
SWITCHES			
	S701-704	SWITCH	RSG1030

CNCB ASSEMBLY

Mark	No.	Description	Part No.
RESISTORS			
	R801	RESISTOR ARRAY 100K	RA5T□□□J
	R802	CARBONFILM RESISTOR	RD1/6PM□□□J

DIKB ASSEMBLY

Mark	No.	Description	Part No.
SWITCHES			
	S301-320	SWITCH	RSG1030

MIJB ASSEMBLY

Mark	No.	Description	Part No.
SEMICONDUCTORS			
	IC601		NJM2068D
CAPACITORS			
	C601, 602	CERAMIC CAPACITOR	CKPUYF223Z25
	C603	MYLOR FILM CAPACITOR	CQMA152J50
	C604	ELECTR. CAPACITOR	CEJA2R2M50
	C605	AXIAL CAPACITOR	CKPUYB681K50
	C606, 607	CERAMIC CAPACITOR	CKPUYB102K50
	C609	MYLOR FILM CAPACITOR	CQMA152J50
	C610	ELECTR. CAPACITOR	CEJA2R2M50
	C611	AXIAL CAPACITOR	CKPUYB681K50
RESISTORS			
	R601-606	CARBONFILM RESISTOR	RD1/6PM□□□J
	R608-611	CARBONFILM RESISTOR	RD1/6PM□□□J
OTHERS			
			VNE1102
	JA601	MIC JACK	VKN1147
	JA602	HEADPHONE JACK	RKN1006
	JA603	MIC JACK	VKN1147

HEPB ASSEMBLY

Mark	No.	Description	Part No.
CAPACITORS			
	C501, 502	AXIAL CAPACITOR	CKPUYB101K50
	C503	CERAMIC CAPACITOR	CGCYX473K25
RESISTORS			
	VR501	ROTARY VR	VCS1020
OTHERS			
			VNE1102
	JA501	JACK	RKN1002

⊙ DRVB ASSEMBLY (VWS1087)

Mark	No.	Description	Part No.
SEMICONDUCTORS			
	IC802		BA15218N
	Q903		DTA124ES
	Q819, 901		2SA933S
	Q816, 818		2SB1185
	Q902		2SC1740S
	Q815, 817		2SD1762
	Q821		2SK184
	D833		MTZJ6.2C
	D834		04AZ10-Y
	D801, 830-832		1SS254
CAPACITORS			
	C935(1F/5.5V)		VCH1039
	C846		CCPUSL470J50
	C838		CEANP010M50
	C840		CEAS010M50
	C835, 836		CEAS101M25
	C837		CKPUYB331K50
	C839		CQMA102J50
RESISTORS			
	ALL RESISTORS		RD1/6PM□□□J

POWER SUPPLY BOARD ASSEMBLY (VWR1109)

Mark	No.	Description	Part No.
SEMICONDUCTORS			
	IC202		TH5P4
	IC211, 212	IC PROTECTOR	ICP-N15
	IC213, 214	IC PROTECTOR	ICP-N50
	IC215	IC PROTECTOR	ICP-N38
	Q201	TRANSISTOR	2SB1331
	Q202		DTC114ES
	D201-203	DIODE	S3LA20
	D204	DIODE	ERB83-006
	D205	DIODE	D1NL20
	D206	ZENER DIODE	MTZ7.5B
	D207	ZENER DIODE	MTZ6.2B
	D209, 210	DIODE	D1NL20
	D213-215	DIODE	D1NL20

Mark	No.	Description	Part No.
COILS/TRANSFORMERS			
	L203	FILTER	VTL1008
CNNB ASSEMBLY			
SWITCHES			
	S201		VSK1017
	CN203		VKN1138
RESISTORS			
	R101, 102	CARBONFILM RESISTOR	RD1/6PM□□□J
OTHERS			
	CN204		VKN1139
HEAD ASSEMBLY			
SEMICONDUCTORS			
	Q1	TRANSISTOR	2SC4081
CAPACITORS			
	C4, 6	CERAMIC CAPACITOR	CKSQYF104Z25
	C3	CHIP CAPACITOR	CKSQYF223Z50
	C5	CAPACITOR	CKSYF105Z16
RESISTORS			
	VR1	VARIABLE RESISTOR	VCP1025

6. ADJUSTMENTS

6.1 JIGS AND INSTRUMENTS REQUIRED FOR ADJUSTMENT

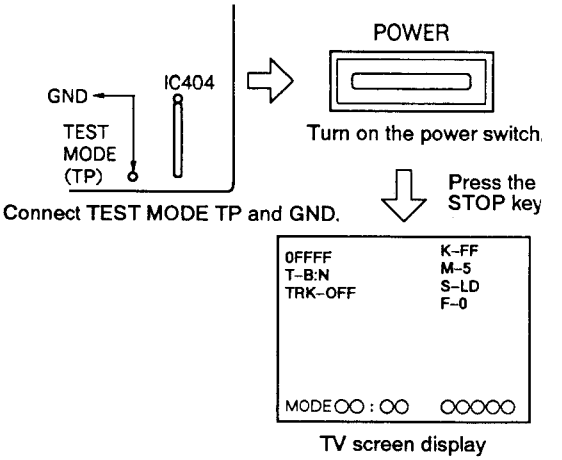
- Small screwdriver (about 10cm long)
- Small Phillips screwdriver
- Phillips screwdriver
- Dual–trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- LD test disc (GGV1003)
- CD test disc (YEDS–7)
- Digital voltmeter
- Shorting clip
- L–shaped eccentric screwdriver (GGV–129)
- TV monitor
- Resistor(47kΩ , 10kΩ ×2)
- Low-pass filter (47kΩ +1 μF)

6.2 TEST MODE

The player has a test mode function which allows the servicer to check the player's status on the TV screen by executing the respective key operation.
Also, since the TRKG servo opens and closes easily, the test mode is especially useful for mechanical adjustments.

6.2.1 TEST MODE INITIATION

[Procedure]
1. Remove the bonnet and disc tray.
2. Connect the TEST MODE (TP) to GND. (See Fig. 1)
3. Turn on the power switch.
4. Disconnect the TEST MODE (TP) from GND.



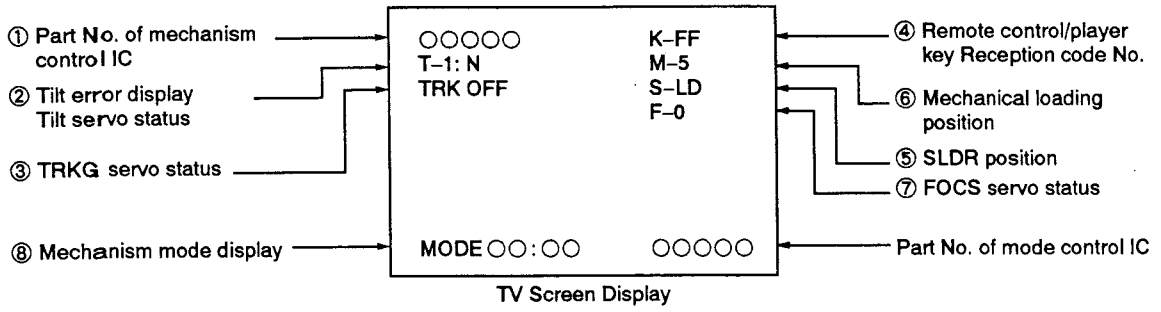
TV screen display

Note: When using the remote control unit (GGF1067) for the test mode.
- *Press the [TEST] key after pressing the [ESC] key.*

6.2.2 TEST MODE CANCELLATION

Turn off the power switch.

6.2.3 TV SCREEN AND FL DISPLAYS IN THE TEST MODE



TV Screen Display

FL Display

① The Mechanical Control IC Part No. will be Displayed.

Example: PD0081A1 → 00810
PD0081B1 → 0081B

② Tilt Servo Status / Tilt Error Display

T-○:○○
- ○○ — Tilt servo status : N...Tilt neutral, ON...Tilt servo ON, OFF...Tilt servo OFF
- ○ — Tilt error display: 0 Tilt −, Tilt neutral, F Tilt +

③ TRKG Servo Status

TV screen display
TRK-○○○
- ○○○ — ON...TRKG servo close, OFF...TRKG servo open

④ Remote Control / Player Key Reception Code No.

TV screen display
K-○○
- ○○ — See table 1.

Code	Function	Code	Function	Code	Function	Code	Function
00	0	20	F JOG0	40	(CHAP / TRK)	60	
01	1	21	F JOG1	41	(FRAM / TIM)	61	
02	2	22	F JOG2	42	(SEARCH)	62	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	
1C	POW ON/OFF	3C		5C			
1D	EDIT	3D		5D			
1E	AUDIO	3E		5E	RNDM (TEST)		
1F	+10	3F		5F	(ESC)		

Table 1. Example of Code

⑤ SLDR Position

TV screen display	FL display	Mode
S-○○○		
└─IN	—	CD inside SW ON
CD	CD	CD active area
CDV	CDV	CDV active area
LD	LD	LD active area
B IN	—	LD B inside SW ON

⑥ Mechanical Loading Position

TV screen display

M-○

└─ 0 ... Tray open
1 ... Loading
2 ... Standby
3 ... Clamped
5 ... Tilt minus
7 ... Tilt plus
8 ... Tilt limit
9 ... B side clamped (two sides)

⑦ Focus offset VR Status

TV screen display

F-○

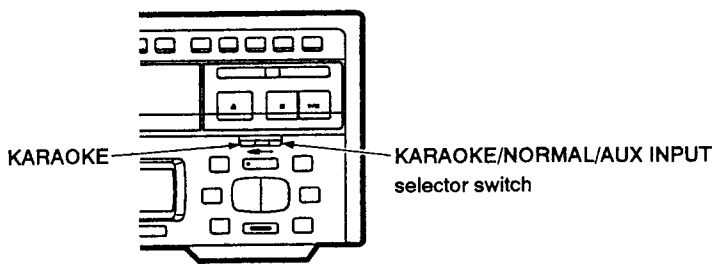
└─ 0 ... Normal state
TRKG close : VR606(CT MAX)
TRKG open : VR605(TE MAX)
1 ... VR606 is activated when opening the TRKG.

⑧ As to the mode indication, refer to the CLD-2090 service guide (ARP2234).

6.2.4 KEY OPERATION IN THE TEST MODE

Function	Player Status	Key Operation	Remarks
Open Tray	STOP mode	⏏	
Close Tray	Tray open	⏏	
Stop	PLAY mode	■	
Play	Disc placement and tray closed.	▶	• Start play with the TRKG servo open. • Raise up with tilt neutral. • The disc type (LD/CD/CDV) is determined when playback starts at the SLDR position during start play.
TRKG Servo Open/Close	PLAY mode	▶	• Each time the PLAY button (▶) is pressed, the TRKG servo will open or close alternately.
Still	PLAY mode TRKG servo closed.	▮▮ (Remote control unit key)	• Each time the STILL button (▮▮) is pressed, the player will switch between the PLAY and STILL modes alternately.
SLDR REV SCAN	PLAY mode	◀◀	• Press and hold down the key. • With the TRKG servo open, the pickup can be damaged if the SLDR moves further inward than the lead-in area on the disc. Do not allow the SLDR to move further inward than the lead-in area.
SLDR FWD SCAN	PLAY mode	▶▶	• Press and hold down the key. • With the TRKG servo open, the pickup can be damaged if the SLDR moves further outward than the lead-in area on the disc. Do not allow the SLDR to move further outward than the lead-in area.
TILT Neutral	POWER switch ON	*♮ (KEY CONTROL key)	
TILT Servo ON	PLAY mode	*♯ (KEY CONTROL key)	
TILT Minus TILT Servo OFF	PLAY mode	⏮	• Press and hold down the keys.
TILT Plus TILT Servo OFF	PLAY mode	⏭	• Press and hold down the keys.
Screen Display ON / OFF	POWER switch ON	PGM key	
Frame search	PLAY mode	+10 key ↓ 0-9 key ↓ ▶	• In the PLAY mode, press the +10 key. (The player will standby for the frame No. entry.) • Use the numeric keys(0—9) to enter the frame No.. Then press the player's PLAY key to search. • After the search is completed, the player will return to the operation mode before the search was performed.
Loading Motor Rotation Clockwise Counterclockwise	Tray open	⏭ ⏮	• FWD: Unloading • REV: Loading
Focus Offset (CT MAX) for Checking VR606	PLAY mode TRKG servo open	*♭ (KEY CONTROL key) (toggle)	VR606 and VR605 : For check F-0 : Normal state - - - - - - TRKG close : VR606 (CT BEST) TRKG open : VR605 (TE MAX) F-1 : VR606 is activated when opening the TRKG.

* Perform key operation by setting the KARAOKE/NORMAL/AUX INPUT selector switch, on the front panel, to the KARAOKE position.

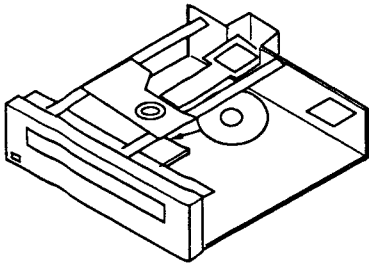


6.2.5 PLAYER OPERATION IN THE TEST MODE

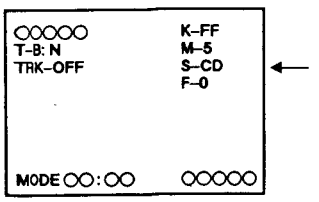
Operate the player by selecting a test mode function with the keys on the player or on the remote control unit.

- CD PLAYBACK

① Place the CD disc on the turn table.
(Clamper is already lifted up.)



② Press the [◀◀] or [▶▶] keys to appear "S-CD" on the TV screen display.

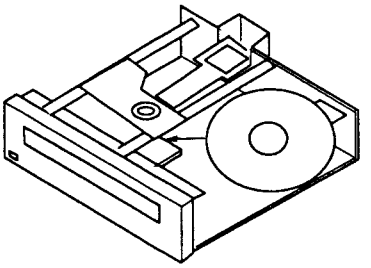


TV screen display

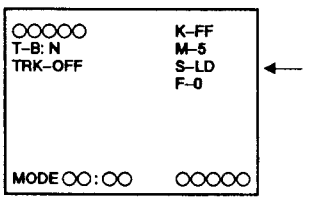
③ Clamp the disc by pressing the PLAY (▶) key once.
Then, press the PLAY (▶) key twice, disc will be normal playbacked.

- LD PLAYBACK

① Place the LD disc on the turn table.
(Clamper is already lifted up.)



② Press the [◀◀] or [▶▶] keys to appear "S-LD" on the TV screen display.



TV screen display

③ Clamp the disc by pressing the PLAY (▶) key once.
Then, press the PLAY (▶) key twice, disc will be normal playbacked.

6.3 PREPARATIONS FOR ADJUSTMENT AND PRECAUTIONS

1) When replacing the pickup assembly, adjust in the following way:

–Carriage assembly in forward state–

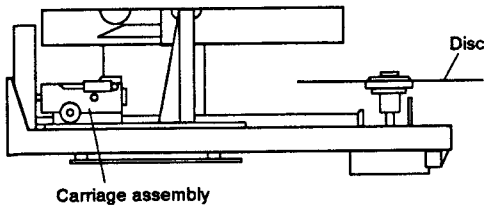
1. Tilt servo gain adjustment
2. Coarse grating adjustment, tracking balance adjustment
3. Slider shaft horizontal
4. Pickup inclination adjustment
5. TRKG error best / crosstalk best adjustment
6. FOCS SUM level adjustment
7. Tilt sensor inclination/tilt balance adjustment
8. Spindle motor centering check
9. Spindle motor centering adjustment
10. Fine grating adjustment
11. RF gain adjustment
12. FOCS servo loop gain adjustment
13. TRKG servo loop gain adjustment

–Carriage assembly in reverse state–

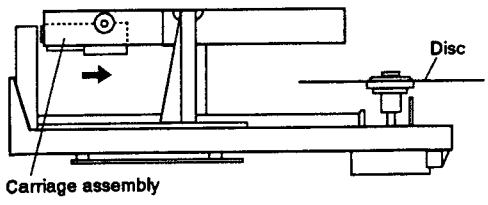
14. Centering adjustment for side B play
15. Pickup tangential direction angle adjustment for side B play
16. Fine centering adjustment for side B play

Note : The forward status of carriage assembly is when the carriage assembly is in the position to play side A of the disc. The reverse status is when it is in the position to play side B of the disc.

Carriage assembly forward state



Carriage assembly reverse state

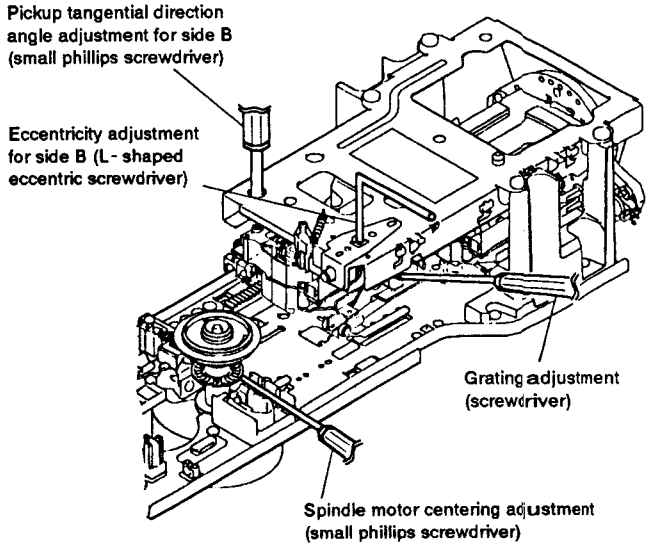


2) Side B play

Direct side B play is possibled by pressing the SIDE B key of the front panel.

3) Where to insert the screwdriver when adjusting the pickup assembly

–Carriage assembly in forward state–



6.4 MAIN ASSEMBLY ADJUSTMENT SUMMARY

	ADJUSTMENT	Adjusting Point	Measurement equipment Connecting Point	Player Condition	Adjusting Specification
1	Tilt Servo Gain Adjustment	VR608	None	• Power OFF	• Making of Tilt gain VR position Red: Turn to right Clear: Center Blue: Turn to left
2	Coarse Grating and Tracking Balance Adjustment	Grating and VR602	CN120-9 (TRKG ERR)	• Test mode #6,500 still TRKG servo open Tilt servo OFF	• Null point → TRKG error MAX • Adjust VR602 so that the TRKG error waveform amplitude's positive and negative level become equal.
3	Slide Shaft Horizontal Adjustment	Player SKIP key	CN120-4 (FOCS RTN)	• #9,800 still #25,000 still TRKG servo open Tilt servo OFF	• Adjust that the FOCS RTN voltage becomes 0 ± 20mV.
4	Pickup Inclination Adjustment	Pickup assembly TAN/TRK inclination adjustment screw	CN120-3 (RF)	• Test mode #2,701 still TRKG servo open/close Tilt servo OFF	• RF waveform's amplitude MAX (Pickup TAN and TRKG adjustment screw) • Minimized crosstalk.
5	TRKG Error Best / Crosstalk Best Adjustment	VR605 (TE MAX) VR606 (CT MAX)	CN120-3 (RF) CN120-9 (TRKG ERR)	• Test mode TRKG servo close / open Tilt servo OFF	• TRKG error MAX (VR605) RF MAX (VR606)
6	FOCS SUM Level Adjustment	VR609	CN120-11 (FOCS SUM)	• Play mode	• Adjust VR609 so that the voltage becomes 1.5V DC.
7	Tilt Sensor Inclination/ Tilt Balance Adjustment	Tilt sensor inclination adjustment screw VR607 (TILT BAL.)	TV monitor Test mode screen	• Test mode #16,200/#115 still TRKG servo loop close • TILT servo OFF	• Set VR607 to the center. • Adjust the adjustment screw so that the tilt error display code is 6, 7, or 8. • Adjust VR607 so that the tilt error display becomes 7.
8	Spindle Motor Centering Check	Check the lissajous figure.	CH1: CN120-9 (TRKG ERR) CH2: CN120-1, 2 (TRKG A+C)	• Test mode #100 and #25,000 TRKG servo open	• Check that the amplitude of the lissajous figure of the frame #100 is the same as that of the frame #25,000.
9	Spindle Motor Centering Adjustment	Spindle motor centering adjustment screw.	CH1: CN120-9 (TRKG ERR) CH2: CN120-1, 2 (TRKG A+C)	• Test mode #100 and #25,000 TRKG servo open / close	• Adjust the centering adjustment screw so that the lissajous figures of #100 and #25,000 are the same.
10	Fine Grating Adjustment	Grating	CH1: CN120-9 (TRKG ERR) CH2: CN120-1, 2 (TRK A+C)	• Test mode #6,500 still TRKG servo open	• Minimize the Y direction of the lissajous figure. • Level of the X direction of the lissajous figure are equal.
11	RF Gain Adjustment	VR601	CH1: CN120-3 (RF)	• Test mode #15,000 still TRKG servo close	• Adjust VR601 so that the RF level becomes 300mV ± 50mV.
12	FOCS Servo Loop Gain Adjustment	VR604	CH1: CN120-8 (FOCS ERR) CH2: CN120-7 (FOCS IN)	• Test mode #15,000 still TRKG servo close	• Adjust VR604 so that the lissajous figure is symmetrical with respect to the X and Y axes.
13	TRKG Servo Loop Gain Adjustment	VR603	CH1: CN120-9 (TRKG ERR) CH2: CN120-10 (TRKG A+C)	• Test mode #15,000 still TRKG servo close	• Adjust VR603 so that the lissajous figure is symmetrical with respect to the X and Y axes.
14	Centering Adjustment for Side B Play	Centering adjustment plate for side B.	CH1: CN120-9 (TRKG ERR) CH2: CN120-1, 2 (TRKG A+C)	• Test mode #100 play TRKG servo open / close	• Adjust that the X-axis amplitude of the lissajous figure becomes maximum.
15	Pickup Tangential Direction Angle Adjustment for Side B Play	Pickup tangential direction angle adjustment screw.	TV monitor	• Test mode #115 still	• Adjust that the crosstalk is minimized.
16	Fine Centering Adjustment for Side B Play	Centering adjustment plate for side B	CH1: CN120-9 (TRKG ERR) CH2: CN120-1, 2 (TRKG A+C)	• Test mode #100 play TRKG servo open	• Adjust that the X-axis amplitude of the lissajous figure becomes maximum.
17	Reference Frequency Adjustment	VC901	R647 lead wire	• Stop mode (blueback screen)	• Adjust VC901 so that the frequency becomes 3.579545 MHz.
18	VCO Centrering Frequency Adjustment	VR481	CH1: C471 lead wire CH2: C499 lead wire	• #5,100 still	• The center of CH1's video signal jitter is delayed by 71 μS with CH2's video signal.
19	Output Video Level Adjustment	VR482	VIDEO OUT terminal	• #19,900 still	• Adjust VR482 so that the voltage between the sync tip and the white peak becomes 1V ± 5%.
20	1H Delay Video Level Adjustment	VR441	CH1: L458 lead wire CH2: L456 lead wire	• #3,800 still	• The 1H delay video level becomes the same as the main line video level.
21	Color Tint Error Signal Level Adjustment	VR521	TV monitor	• #8,000 still	• Color irregularity on the magenta screen is minimized.

6.5 ADJUSTMENT POINTS OF THE MAIN ASSEMBLY

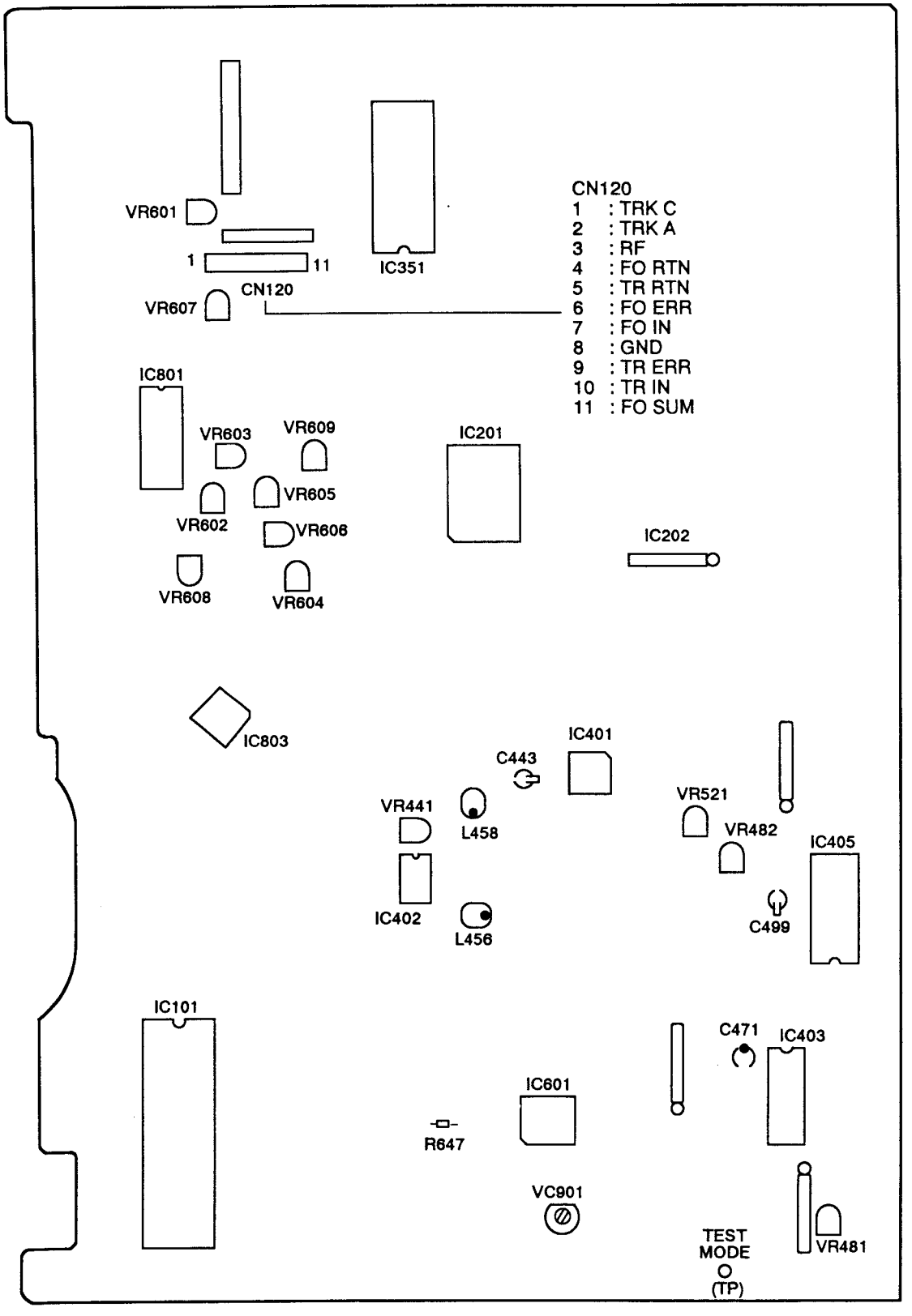


Fig.1 Adjustment Locations

6.6 MECHANICAL ADJUSTMENT

1. TILT SERVO GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: Adjustment of the tilt servo's gain according to the tilt sensor's sensitivity rank.
- When not properly adjusted: Increased tilt servo hunting and increased crosstalk.

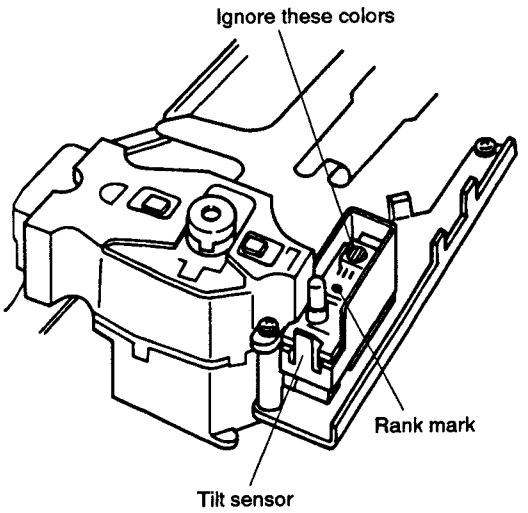
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Small screwdriver		• Stop mode	• VR608 (TILT GAIN)

Adjustment Procedure

1. Use a screwdriver to adjust the angle of VR608 according to the rank indicator's color.

Rank	Color	VR Angle
A	Red	Clockwise all the way
B	Clear	Mechanical center
C	Blue	Counterclockwise all the way

Connection diagram



2. COARSE GRATING AND TRACKING (TRKG) BALANCE ADJUSTMENT

Mechanical Adjustment

- Purpose: To adjust the laser beam which is divided into three by the grating to the optimum position on the track. Set the TRKG servo offset voltage to 0V.
- When not properly adjusted: Disc playback will be impossible. During play, tracks may be skipped.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Small screwdriver • Oscilloscope • 8–inch LD test disc (GGV1003)	• CN120–9 (TRKG ERR)	• Test mode • Still mode (#6,500) • TRKG servo: Open • Tilt servo OFF • The carriage assembly should be in the forward state.	• Grating • VR602 (TRKG BAL)

Adjustment Procedure

<Coarse Grating Adjustment>

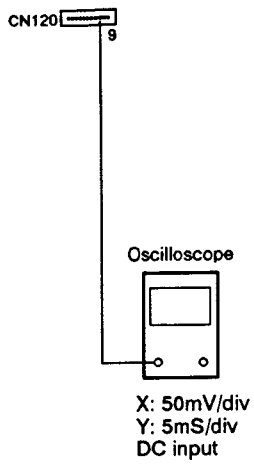
1. Play the LD test disc.
2. Search around for frame #6,500.
3. Open the TRKG servo.
4. Connect an oscilloscope to CN120–9 and observe the waveform.
5. Insert the smal screwdriver into the grating adjustment hole. Turning the grating will allow you to vary the amplitude of the TRKG error waveform. Find the position where the waveform amplitude becomes minimum with a smooth envelope. (Fig. 2) (This indicates that the 3–way split laser beams are directed onto the track. This is called the "on–track" position.)
6. Slowly turn the grating counterclockwise from the on track position until the waveform amplitude becomes maximum. (Fig. 3)
7. Close the TRKG servo and check that a normal picture is displayed on the TV screen.

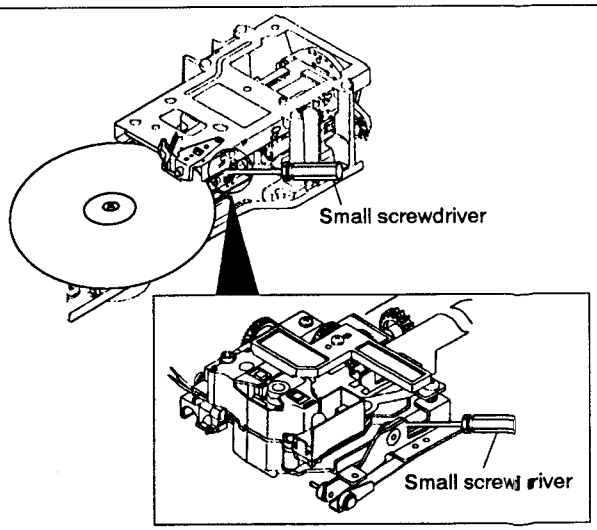
<TRKG Balance Adjustment>

1. Align the oscilloscope GND so that it comes to the center of the oscilloscope screen.
2. Adjust VR602 so that the positive and negative amplitude of the TRKG error waveform become equal. (Fig. 3)

Note: If adjustment of VR602 fails to disturb the tracking, perform the adjustment after set VR607 to the mechanical center.

Connection diagram





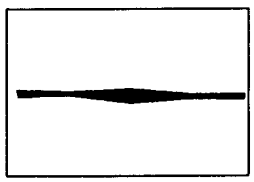


Fig. 2
On–track Position

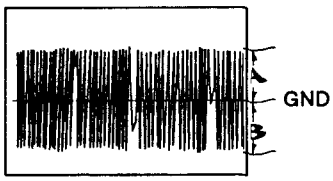


Fig. 3
Maximum Amplitude A=B

3. SLIDER SHAFT HORIZONTAL ADJUSTMENT

Mechanical Adjustment

- Purpose: Setting the slider shaft horizontally to enable the pickup to more over the disc horizontally.
- When not properly adjusted: With a warped disc, the FOCS servo does not function at the inner or outer periphery.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • Low–pass filter (47kΩ +1 μF) • 8–inch LD test disc (GGV1003) (• Digital voltmeter)	• CN120–4 (FOCS RTN) and GND	• Test mode • Still mode (#9,800, #25,000) • TRKG servo: Open • Tilt servo OFF	• SKIP key (⏮ or ⏭) (During test mode)

Adjustment Procedure

1. Use the SCAN (◀◀ or ▶▶) key to send the slider to frame #9,800 or thereabouts (tilt fulcrum) on the test disc. Open the TRKG servo.
2. Connect the oscilloscope to CN120–4 through L.P.F. and match the center of the waveform with the oscilloscope's GND.
3. Search for frame #25,000 and use the SKIP (⏮ or ⏭) key to adjust the center of the waveform to 0V ± 20mV.

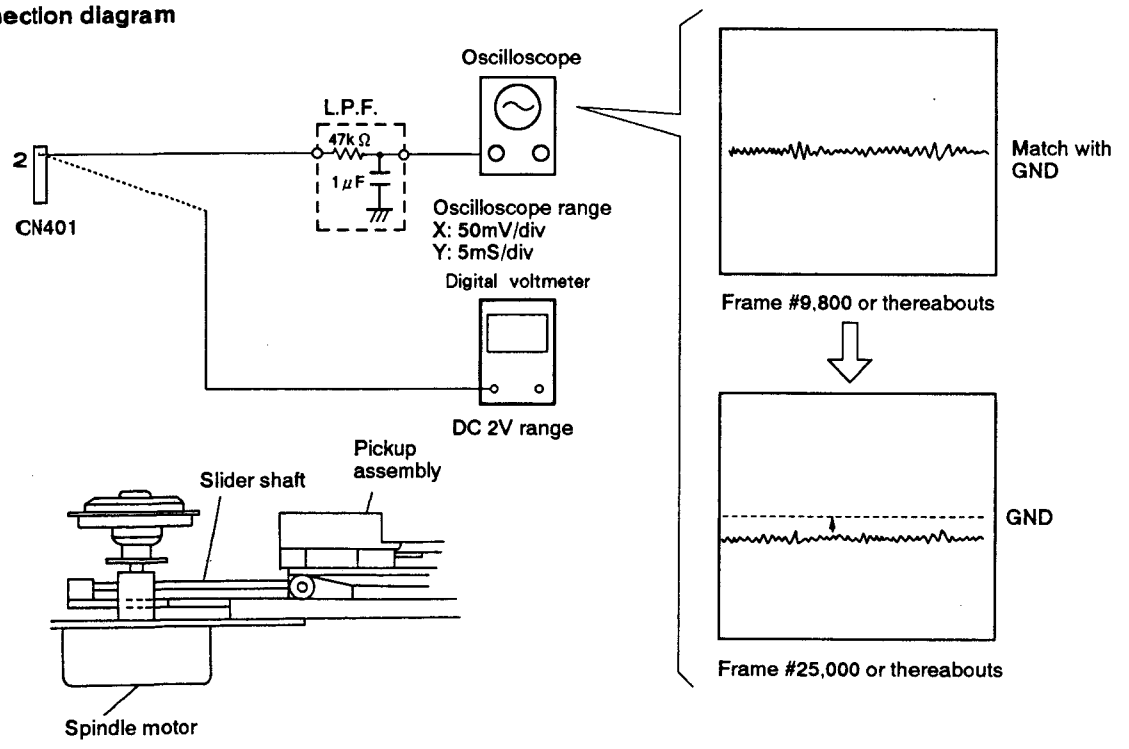
Note: This adjustment is critical in that it will affect the adjustments following.

WHEN USING DIGITAL VOLTMETER

Note: In this adjustment, it is not necessary to use L.P.F. (47kΩ +1 μF).

1. Connect a digital voltmeter to CN120–4.
2. Open the TRKG servo, and search around for frame #9,800.
3. Check the voltage.
4. Search around for frame #25,000 and check that the voltage is same as the frmae #9,800. If not, adjust the SKIP key so that the voltage is same as the frame #9,800.

Connection diagram



4. PICKUP INCLINATION ADJUSTMENT

Mechanical Adjustment

- Purpose: Adjustment of the pickup inclination to direct the laser beam vertically with respect to the disc.
- When not properly adjusted: Crosstalk will be generated.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • Phillips screwdriver • Oscilloscope • 8–inch LD test disc (GGV1003)	• CN120–3 (RF)	• Test mode • Still mode [#2,701 (black screen)] • Tilt servo OFF	• Pickup assembly TRKG • Tangential direction inclination adjustment screws

Adjustment Procedure

1. Connect the oscilloscope to CN120–3.
2. Search for #2,701 and observe the RF waveform. (Fig. 4)
3. Adjust the pickup's TRKG/Tangential direction inclination adjustment screw to maximize the waveform's amplitude.
4. Look at the TV screen and make sure there is no crosstalk.

Note : If there is crosstalk on the TV screen even when the RF level is at the maximum, perform next steps.

Connection diagram

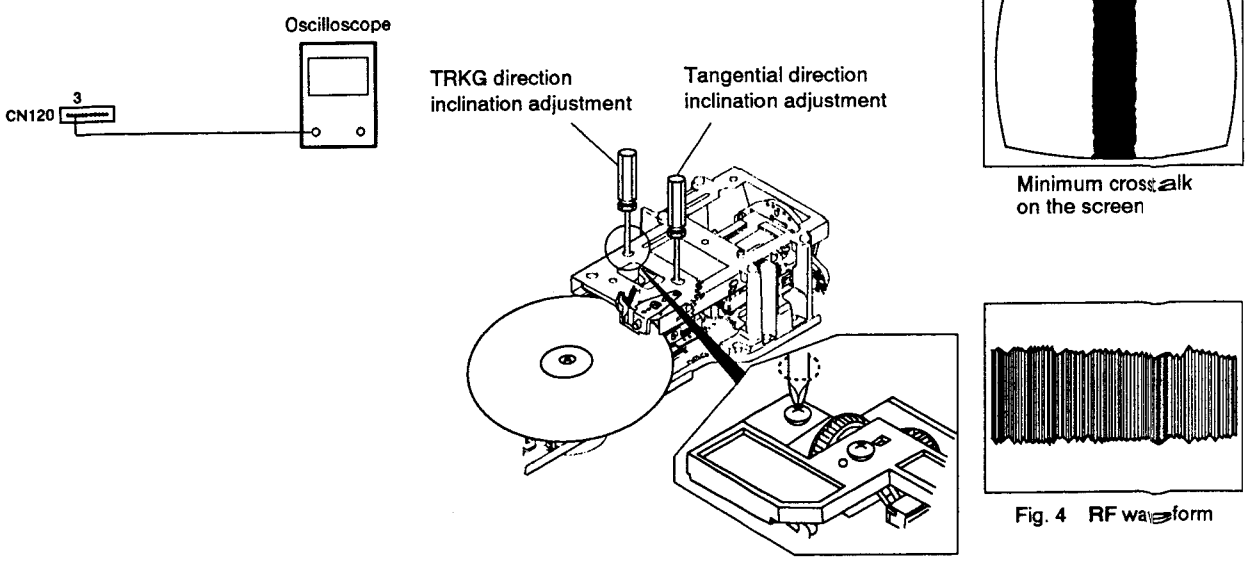


Fig. 4 RF waveform

5. TRKG ERROR BEST/CROSSTALK BEST ADJUSTMENT

Mechanical Adjustment

- Purpose: To set the FOCS servo to the optimum state when playing the normal playback and track jump (search),
- When not properly adjusted: Crosstalk will be generated.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • Oscilloscope • 8–inch LD test disc (GGV1003)	• CN120–3 (RF) • CN120–9 (TRKG ERR) • Player's VIDEO OUT terminal	• Test mode • TRKG servo close/open • Tilt servo OFF	• VR605 (TE MAX) • VR606 (CT MAX)

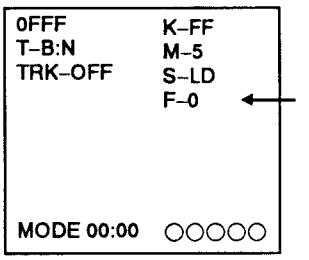
Adjustment Procedure

Note : Perform this adjustment when there is still noticeable crosstalk on the TV screen in section "3. Pickup Tangential Direction Angle Adjustment".

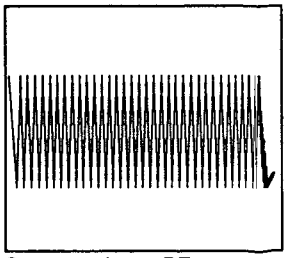
1. Connect the oscilloscope to CN120–9.
2. Open the TRKG servo .
3. Confirm that the test mode screen display is F–0.
   If not, set to F–0 with " ♭ " button of KEY CONTROL.
4. Adjust VR605 so that the amplitude of the TRKG error waveform becomes maximum.
5. Close the TRKG servo.
6. Connect the oscilloscope to CN120-3.
7. Press the " ♭ " button of KEY CONTROL to display "F–1" on the TV screen.
8. Search frame #2,701 and adjust VR606 so that the amplitude of the RF waveform becomes maximum.
9. Confirm that the crosstalk on the TV screen becomes minimum at frame #115.

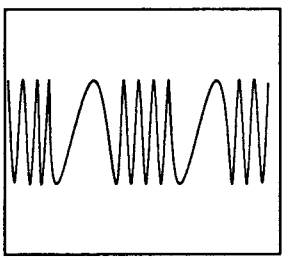
Note : After adjustment is complete, be sure to perform "6. FOCS SUM Level Adjustment".

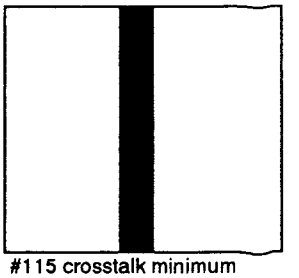
Connection diagram



Screen display of test mode


Set to maximum RF amplitude at frame #2,701.


Maximize the TRKG error.


#115 crosstalk minimum

6. FOCS SUM LEVEL ADJUSTMENT

Mehanical Adjustment

- Purpose: To set the sum level (FOCS A+B) of B1—B4 to the optimum value for activating the FOCS servo.
- When not properly adjusted: Playability is poor.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • Oscilloscope • 8–inch LD test disc (GGV1003)	• CN120–11 (FOCS SUM)	• Test mode • Still mode (#15,000) • TRKG servo: Close • Tilt servo: Neutral	• VR609 (FOCS SUM LEVEL)

Adjustment Procedure

Note : Perform this adjustment after perform the "5. TRKG Error Best / Crosstalk Best Adjustment".

1. Connect the oscilloscope to CN120–11.
2. Adjust VR609 so that the voltage becomes 1.5V DC.

Connection diagram

7. TILT SENSOR INCLINATION/TILT BALANCE ADJUSTMENT

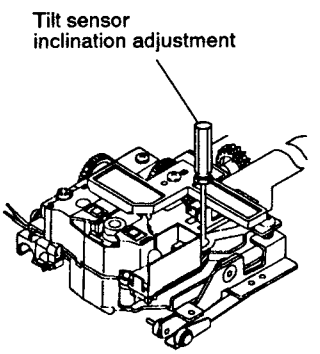
Mechanical Adjustment

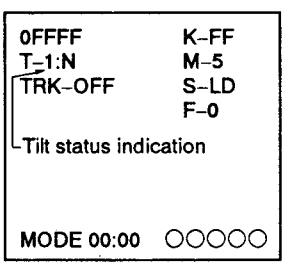
- Purpose: Adjustment of the tilt sensor's inclination to direct the tilt sensor's LED vertically with respect to the disc. Also, compensation for the sensitivity difference between the two sensors.
- When not properly adjusted: Crosstalk will be generated.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • Small phillips screwdriver • 8–inch LD test disc (GGV1003)	• Player's VIDEO OUT terminal	• Test mode • Still mode (#16,200, #115) • TRKG servo closed • Tilt servo OFF	• Tilt sensor inclination adjustment screw • VR607 (TILT BAL)

Adjustment Procedure

1. Search for frame #16,200 on the test disc.
2. Set VR607 to the mechanical center.
3. Adjust the tilt sensor inclination adjustment screw so that the tilt status display code is 6, 7, or 8 on the TV monitor.
4. Search for frame #115.
5. Adjust VR607 so that the tilt error display becomes 7.





TV screen display

Note: This display indicates the tilt error display's location. Other displays may differ slightly from the actual.

8. SPINDLE MOTOR CENTERING CHECK

Mechanical Adjustment

• Purpose: To check that the center of the spindle motor is on the orbit of the laser beam.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • Resistor (10kΩ × 2) • 8-inch LD test disc (GGV1003) • CD test disc (YEDS-7)	• CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)	• Play mode • Test mode • TRKG servo: Open • Tilt servo ON • The carriage assembly should be in the forward state.	• Check the Lissajous figure

Checking Procedure

1. Play the 8 - inch LD test disc.
2. Move the pickup to frame #25,000 by scanning or searching, then open the TRKG servo.
3. Connect the X-input (CH-1) of the oscilloscope to CN120-9 and the Y-input (CH-2) to CN120-1 and 2 .
   Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG (A+C) signal.
4. Write down the Y-axis amplitudes of the Lissajous figures. (Fig. 6)
5. Close the TRKG servo and search frame #100, then open the TRKG servo again to observe the Lissajous figure.
   At this time, check that the Y-axis amplitude of the Lissajous figure is the same as that noted in step 4. (Fig. 7)
6. Remove the 8-inch LD test disc from the player, then load the CD test disc and repeat the checking procedures steps 1 to 5. However, it is not necessary to specify the inner or outer track positions of the disc. If the Y-axis amplitude of the Lissajous figure is different for the inner and outer tracks, perform "9. Spindle Motor Centering Adjustment".

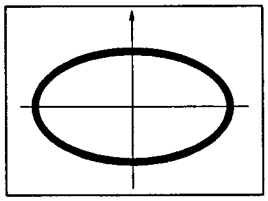
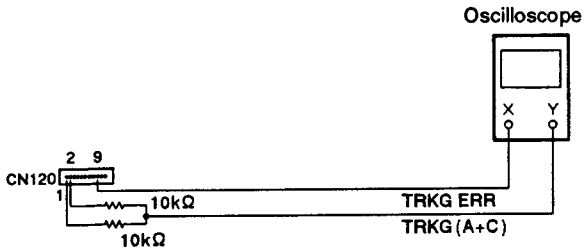


Fig. 5 Lissajous figure when not properly adjusted

Connection diagram



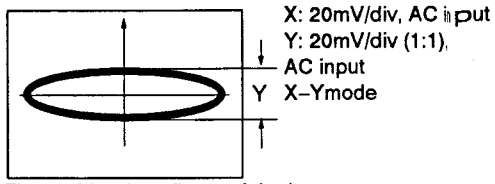


Fig. 6 Lissajous figure of the inner track of the disc (CD)

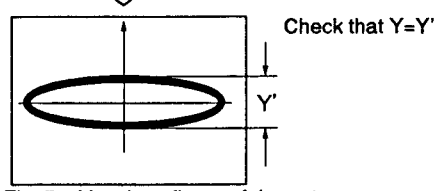


Fig. 7 Lissajous figure of the outer track of the disc (CD)

9. SPINDLE MOTOR CENTERING ADJUSTMENT

Mechanical Adjustment

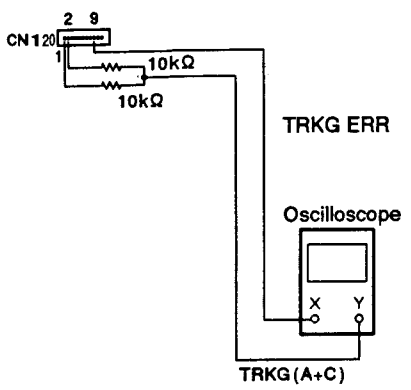
- Purpose: To adjust so that the center of the spindle motor is on the orbit of the laser beam.
- When not properly adjusted: Track skips, or searching takes too long.

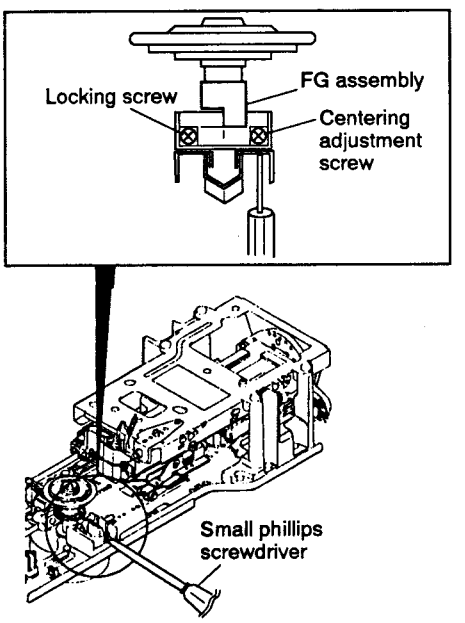
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Small phillips screwdriver • Oscilloscope • Resistor (10kΩ × 2) • 8-inch LD test disc (GGV1003) • CD test disc (YEDS-7)	• CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)	• Test mode • Play mode • TRKG servo: Open/Close • Tilt servo ON • The carriage assembly should be in the forward state.	• Spindle motor centering adjustment screw

Adjustment Procedure

1. Connect the X-input (CH-1) of the oscilloscope to CN120-9 and the Y-input (CH-2) to CN120-1 and 2.
2. Play the 8-inch LD test disc and search frame #25,000.
3. Open the TRKG servo and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
4. Fine-ajust the grating so that the Y-axis amplitude of the Lissajous figure is minimized. (Fig. 9)
5. Close the TRKG servo and search frame #100.
6. Open the TRKG servo again and observe the Lissajous figure and write the values down. (Fig. 8)
7. Loosen a locking screw and insert the small phillips head screwdriver from the adjusting hole, and turn the centering adjustment screw slowly so that the Y-axis amplitude of the Lissajous figure is reduced. After the Y-axis amplitude of the Lissajous figure is minimized, turn the adjusting screw further until the amplitude becomes the same shape as that observed in procedure 6. (Fig. 8—10)
8. Close the TRKG servo, and move the pickup assembly to the outer track of the disc (#25,000), then perform the adjustments in steps 4 to 6 again.
9. Re-open the TRKG servo and observe the Lissajous figure to check that the Y-axis amplitude is minimum. (Fig. 9)
   If the Y-axis amplitude of the Lissajous figure is larger than specified, repeat the adjustment proce-dures from steps 5 to 8.
10. After adjustment is complete, perform the adjustment in "8. Spindle Motor Centering Check" item 6.
11. Tighter the locking screw.

Connection diagram





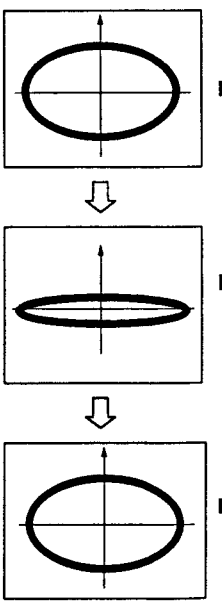


Fig. 8

Fig. 9

Fig. 10

Lissajous figure.

10. FINE GRATING ADJUSTMENT

- Purpose: To fine adjust the grating so that the two tracking beams for the TRKG servo are projected in the optimum positions on the tracks being played. Set the TRKG servo loop offset voltage to 0V.
- When not properly adjusted: During play, tracks may be skipped.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • Small screwdriver • Resistor (10kΩ × 2) • 8-inch LD test disc (GGV1003)	• CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)	• Test mode • Still mode (#6,500) • TRKG servo: Open • Tilt servo ON • The carriage assembly should be in the forward state.	• Grating

Adjustment Procedure

1. Play the LD test disc and search frame #6,500, then open the TRKG servo.
2. Connect the X-input (CH-1) of the oscilloscope to CN120-9 and the Y-input (CH2) to CN120-1 and 2 .
   Set the oscilloscope to the X-Y mode and observe the Lissajous figures of the TRKG error signal and the TRKG sum signal.
3. Insert the small screwdriver into the grating adjustment hole, and fine-adjust the grating so that the Y-axis amplitude of the Lissajous figures is minimized. (Fig. 11)
   If the grating is turned too much and the optimum position can no longer be found, repeat the "2. Coarse Grating Adjustment".
4. Select the oscilloscope's X-input (CH-1) and check that the positive and negative amplitudes of the TRKG error signal are equal. (Fig. 12)
   If they are not, repeat the "2. Tracking Balance Adjustment".
5. Close the TRKG servo and check that the picture (image) on the TV screen is normal.

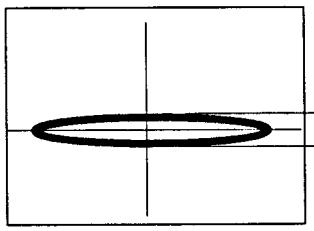


Fig. 11
Fine grating adjustment

Y-axis amplitude of Lissajous figure becomes minimum.

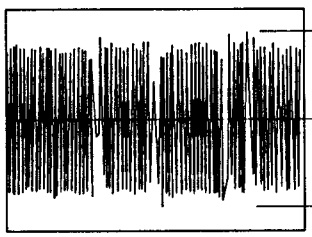
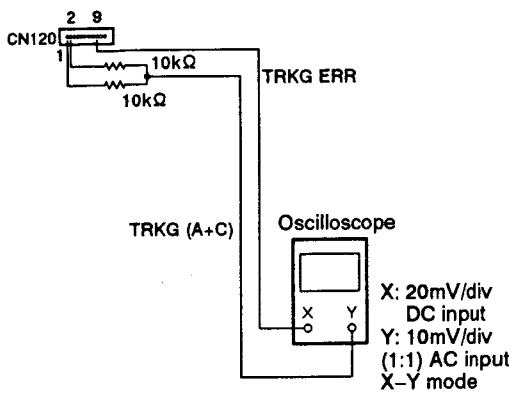
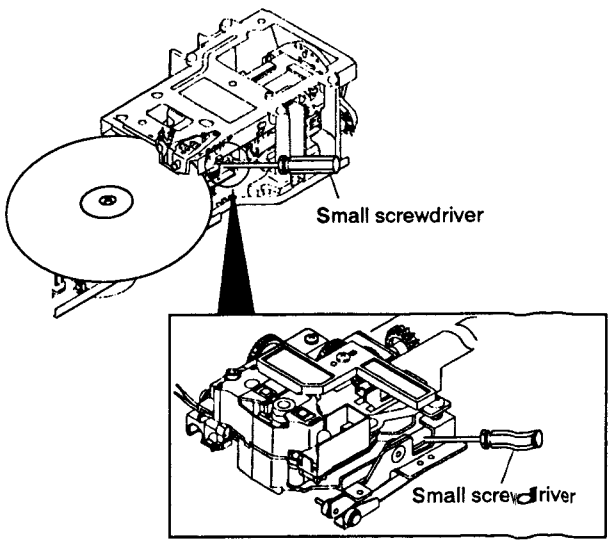


Fig. 12
TRKG balance

Connection diagram





11. RF GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: To adjust the RF signal amplitude to the optimum value.
- When not properly adjusted: Dropout occurs frequently.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • 8-inch LD test disc (GGV1003)	• CN120-3 (RF signal)	• Test mode • Still mode (#15,000) • TRKG servo: Close • Tilt servo: ON • The carriage assembly should be in the forward state.	• VR601 (RF LEVEL)

Adjustment Procedure

1. Play the LD test disc and search frame #15,000.
2. Connect an oscilloscope to CN120-3 (RF signal) and observe the RF signal.
3. Adjust VR601 so that the amplitude of the RF signal becomes 300mV ± 50mV. (Fig. 13)

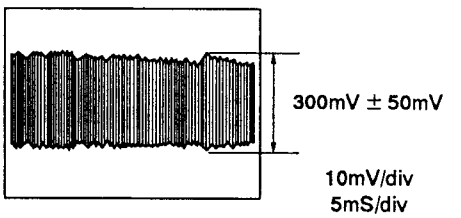
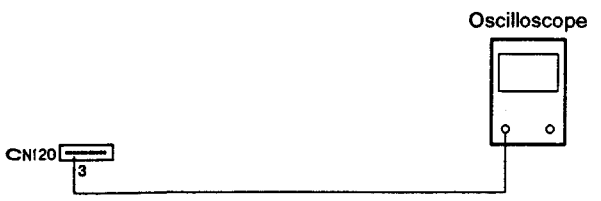


Fig. 13 RF signal

Connection diagram



12. FOCUS SERVO LOOP GAIN ADJUSTMENT

- Purpose: To set the loop gain of the FOCS servo to the optimum value.
- When not properly adjusted: Performance deteriorates.

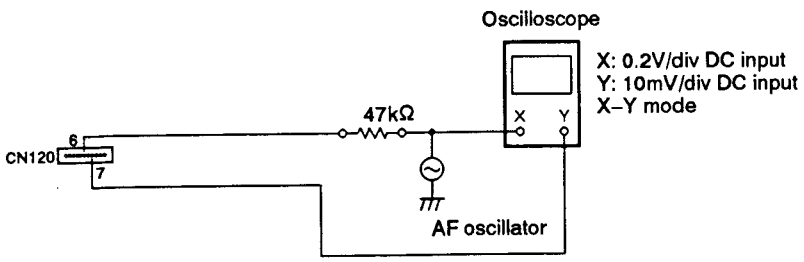
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • AF oscillator • Resistor (47kΩ) • 8–inch LD test disc (GGV1003)	• CN120–6 (FOCS ERR) and CN120–7 (FOCS IN)	• Test mode • Still mode (#15,000) • TRKG servo: Close • Tilt servo: ON • The carriage assembly should be in the forward state.	• VR604 (FOCS GAIN)

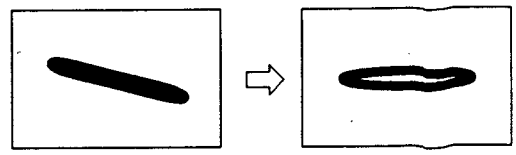
Adjustment Procedure

1. Connect the oscilloscope's X–input (CH–1) via the resistor and AF oscillator to CN120–6, and the Y–input (CH–2) to CN120–7, as shown in the connection diagram.
2. Set the AF oscillator output to 1.7kHz/6Vp–p for GGV1003, according to the test disc used.
3. Play the 8–inch LD test disc and search frame #15,000.
4. Set the oscilloscope to the X–Y mode and observe the Lissajous figure.
5. Adjust VR604 so that the Lissajous figure is symmetrical on both the X–axis and Y–axis of the oscilloscope. (Fig. 14)

Note: If the AF oscillator output does not exceed 6Vp–p, reduce the value of the resistor (47kΩ) in the connection diagram, for easier observation of the Lissajous figure. (not below 33kΩ)

Connection diagram





Adjustment not complete　　Properly adjusted

Fig. 14

13. TRKG SERVO LOOP GAIN ADJUSTMENT

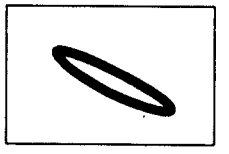
- Purpose: To set the loop gain of the TRKG servo to the optimum value.
- When not properly adjusted: Performance deteriorates

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • Resistor (47kΩ) • AF oscillator • 8–inch LD test disc (GGV1003)	• CN120–9 (TRKG ERR), CN120–10 (TRKG IN)	• Test mode • Still mode (#15,000) • TRKG servo: Close • Tilt servo: ON • The carriage assembly should be in the forward state.	• VR603 (TRKG GAIN)

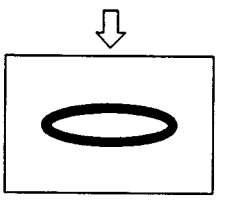
Adjustment Procedure

1. Connect the oscilloscope's X–input (CH–1) via the reisitor and AF oscillator to CN120–9, and the Y–input (CH–2) to CN120–10, as shown in the connection diagram.
2. Set the AF oscillator output to 3.0kHz/6Vp–p for GGV1003, according to the test disc used.
3. Set the oscilloscope to the X–Y mode and observe the Lissajous figure.
4. Play the LD test disc and search frame #15,000.
5. Adjust VR603 so that the Lissajous figure is symmetrical on both the X–axis and Y–axis of the oscilloscope. (Fig. 15)

Note : If the AF oscillator output does not exceed 6Vp–p, reduce the value of the resistor (47kΩ) in the connection diagram, for easier observation of the Lissajous figure. (not below 33kΩ)



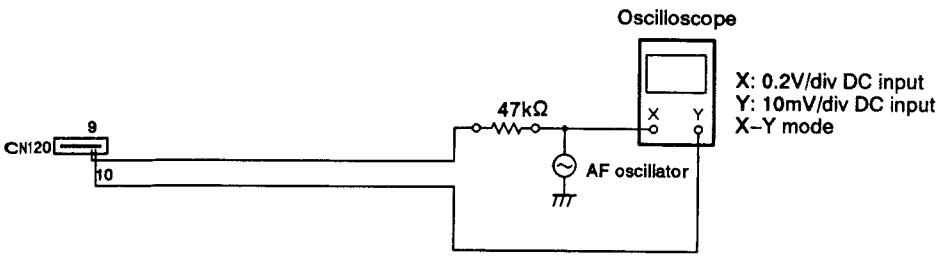
Adjustment not complete



Properly adjusted

Fig. 15

Connection diagram



14. CENTERING ADJUSTMENT FOR SIDE B PLAY

Mechanical Adjustment

- Purpose: To check that the position check at the start play and to set the center of the spindle motor on the path of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped, longer searching time or searching is impossible when playing side B of the disc.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• L-shaped eccentric screwdriver (GGV-129) • Oscilloscope • Resistor (10kΩ) • 8-inch LD test disc (GGV1003)	• CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)	• Test mode • Play mode • TRKG servo: Open/Close • Tilt servo ON • The carriage assembly should be in the reverse state.	• Centering adjustment plate for side B

Adjustment Procedure

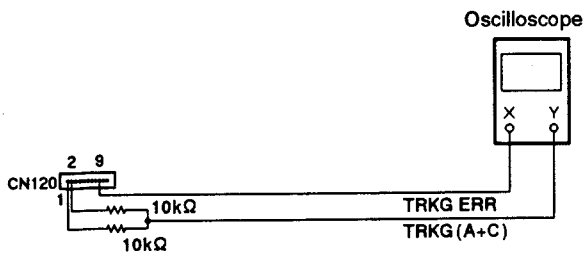
1. Turn the LD test disc upside-down (change from side A to side B). The start play position from side A to B should be within frame #3,500.
2. Set the oscilloscope to the X-Y mode, and connect the oscilloscope's X-input (CH-1) to CN120-9 (TRKG ERR) and the Y-input (CH-2) to CN120-1 and 2 (TRKG A+C).
3. Play the LD test disc and search frame #100, then open the tracking servo.

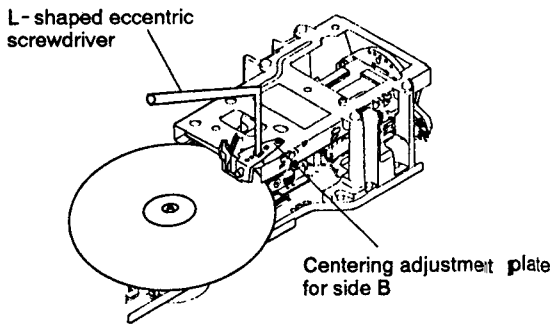
Note: If the center is too eccentric on side B of the disc, since searching will be impossible on side B, open the TRKG servo when the carriage assembly moves to the side B play position and searches around frame #100.

4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure is minimized (on-track position). Then turn the eccentric screwdriver clockwise further until the X-axis amplitude of the Lissajous figure becomes maximum. (Fig. 16)

Note: When "4. Pickup inclination Angle Adjustment is performed with the pickup in the forward state, perform "15. Pickup Tangential Direction Angle Adjustment for Side B Play" and "16. Fine Centering Adjustment for Side B play".

Connection diagram





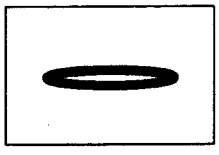


Fig. 16

Properly adjusted (X: maximum).

15. PICKUP TANGENTIAL DIRECTION ANGLE ADJUSTMENT FOR SIDE B PLAY

Mechanical Adjustment

- Purpose: To adjust the crosstalk to become minimum in the tangential direction angle of the pickup assembly when playing side B of the disc.
- When not properly adjusted: Crosstalk is significant.

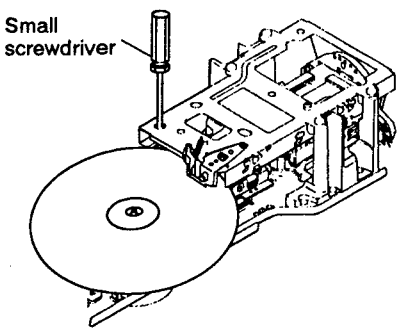
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • Small Phillips screwdriver • 8–inch LD test disc (GGV1003)	• Monitor screen	• Test mode • Still mode (#115) • TRKG servo: Close • Tilt servo ON • The carriage assembly should be in the reverse state.	• Pickup tangential direction angle adjustment screw

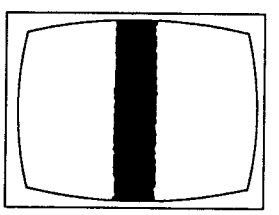
Adjustment Procedure

1. Play the LD test disc and search frame #115.
2. Check if crosstalk appears on the screen of the TV monitor, and adjust the pickup tangential direction angle adjustment screw so that the crosstalk is minimized.
3. After steps 1 and 2 have been completed, perform "14. Centering Adjustment for Side B Play" again.

Note: When the pickup tangential direction angle for side B play is varied by this adjustment, the center of the disc for side B may be shifted slightly. As a countermeasure, perform the centering adjustment again.

Connection diagram





2. Minimum crosstalk

16. FINE CENTERING ADJUSTMENT FOR SIDE B PLAY

Mechanical Adjustment

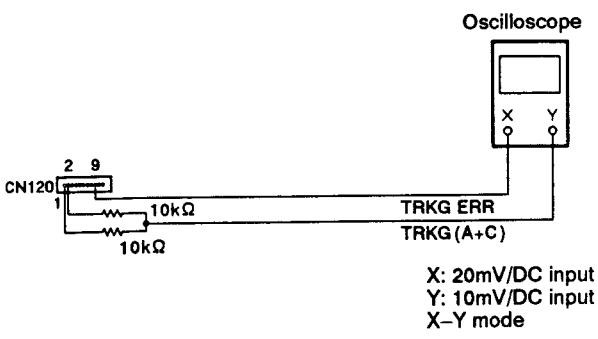
- Purpose: To set the center of the spindle motor on the track of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped when playing side B of the disc.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • L-Shaped eccentric screwdriver (GGV-129) • Resistor (10kΩ × 2) • 8-inch LD test disc (GGV1003)	• CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)	• Test mode • Play mode • TRKG servo: Open • Tilt servo ON • The carriage assembly should be in the reverse state.	• Centering adjustment plate for side B

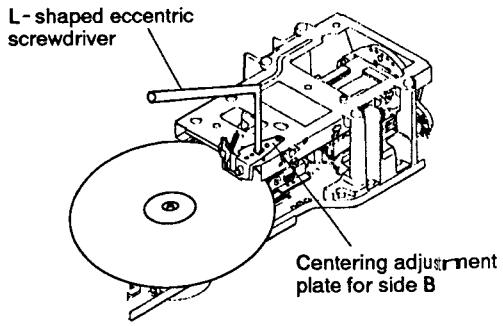
Adjustment Procedure

1. Set the oscilloscope to the X-Y mode, and connect the oscilloscope's X -input (CH-1) to CN120-9 (TRKG ERR) and the Y-input (CH-2) to CN120-1 and 2 (TRKG A+C).
2. Play the LD test disc and search frame #100.
3. Open the TRKG servo.
4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure becomes maximum. (Fig. 17)
5. Turn the power OFF.
6. Fixing and locking the screws as follws;
   Spindle motor centering adjustment screw
   Pickup tangential direction angle adjustment screw
   Centering adjustment plate for side B
   Tilt sensor screw

Connection diagram



X: 20mV/DC input
Y: 10mV/DC input
X-Y mode



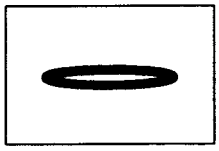


Fig. 17

X-axis of Lissajous figure maximum.

6.7 ELECTRICAL ADJUSTMENT

17. REFERENCE FREQUENCY ADJUSTMENT

Electrical Adjustment

- Purpose: Adjustment of the standard clock frequency.
- When not properly adjusted: Incorrect color tint. No TV color lock. VCXO cannot be adjusted during LDD playback.

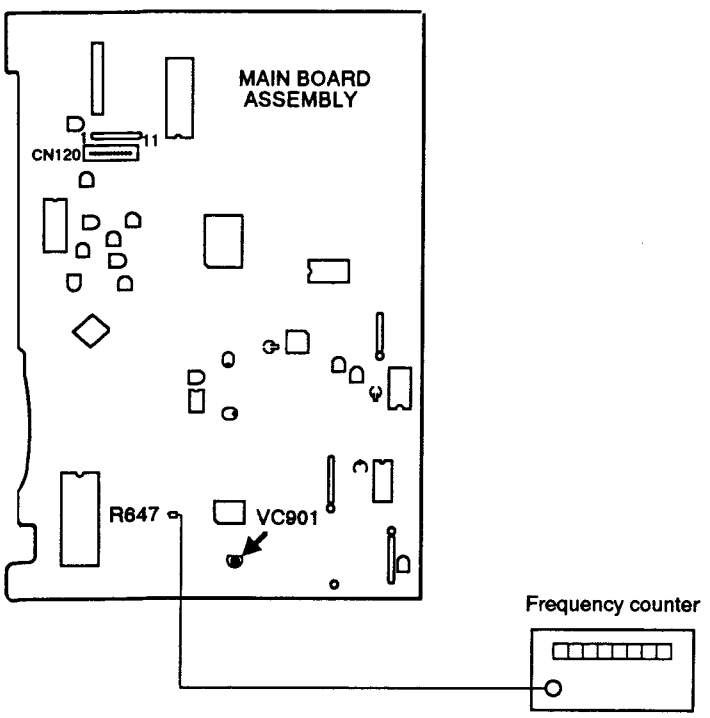
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Frequency counter • Oscilloscope 10:1 probe	• Lead wire of R647	• Normal mode • Stop mode (Blueback screen)	• VC901 (REF FREQ.)

Adjustment Procedure

1. Adjust VC901 so that the frequency of the lead wire of R647 becomes 3.579545MHz in the stop mode (blueback screen).

Note : The frequency counter probe should be an oscilloscope 10 : 1 probe.

Connection diagram



18. VCO CENTERING FREQUENCY ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the optimum delay time for the time axis error copensation CCD.
- When not properly adjusted: It is difficult to color lock, there is color lock delay after a search, and there is flicker on the white screen.

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • 8–inch LD test disc (GGV1003)	• CH1: lead wire of C471. • CH2: + side lead wire of C499.	• Normal mode • Still mode (#5,100)	• VR481 (VCO FREQ.)

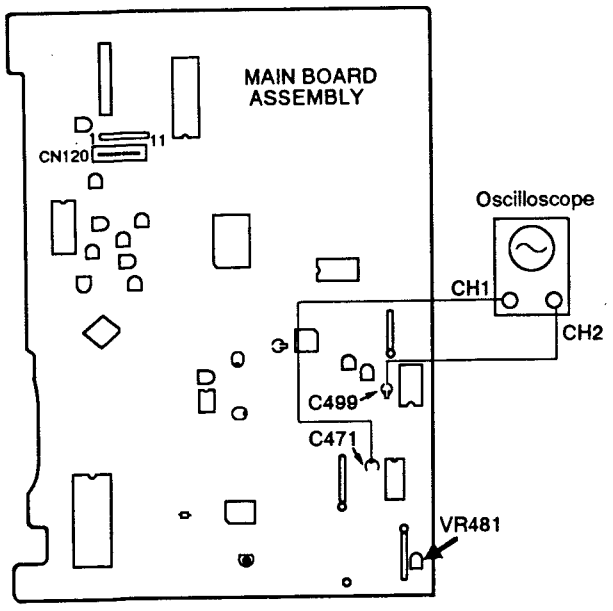
Adjustment Procedure

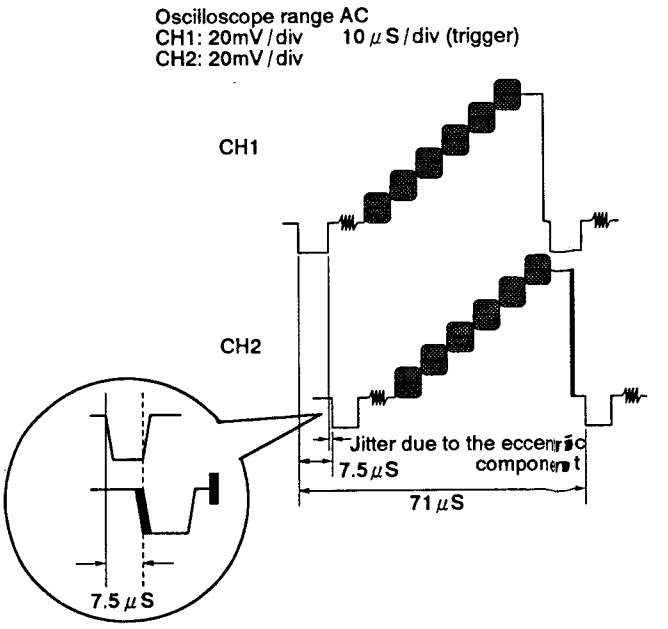
1. Connect the lead wire of C471 and the + side lead wire of C499 to CH 1 and CH 2 of the oscilloscope respectively.
   CH 1 : Video signal before time axis error compensation.
   CH 2 : Video signal after time axis error compensation.

2. Search for frame #5,100 on the test disc. Adjust VR481 so that the center of CH 1's video signal jitter is delayed by 71 μs (1H + 7.5 μs) with respect to the CH 2's video signal.

Note : Do not confuse CH 1 and CH 2.

Connection diagram





19. OUTPUT VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the video signal level to 1Vp–p (75 Ω termination).
- When not properly adjusted: The player starts up midway without reading the data. The screen is too bright or too dark.

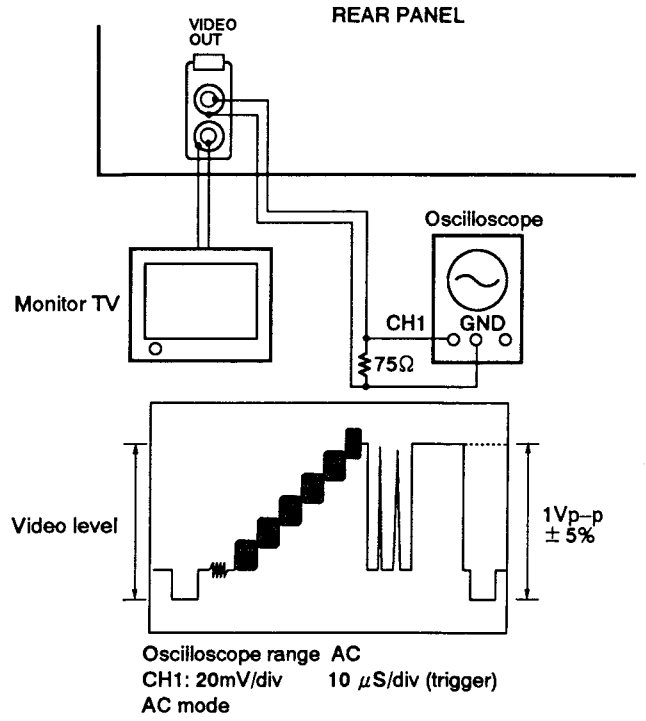
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • 8–inch LD test disc (GGV1003)	• Player's VIDEO OUT terminal	• Normal mode • Still mode (#19,900)	• VR482 (VIDEO LEVEL)

Adjustment Procedure

Note : Connect a oscilloscope to the VIDEO OUT terminal terminating with 75Ω .

1. Search for frame #19,900 on the test disc.
2. Adjust VR482 so that the white level becomes 1Vp–p ± 5% from the video signal's sync tip level.

Connection diagram



Oscilloscope range AC
CH1: 20mV/div 10 μS/div (trigger)
AC mode

20. 1H DELAY VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Equalization of the video levels of the 1H delay video signal and the main line video signal.
- When not properly adjusted: If the 1H delay video signal level is high, white dropout will be noticeable and there will be H shifting. (Horizontal stripes across the screen.)

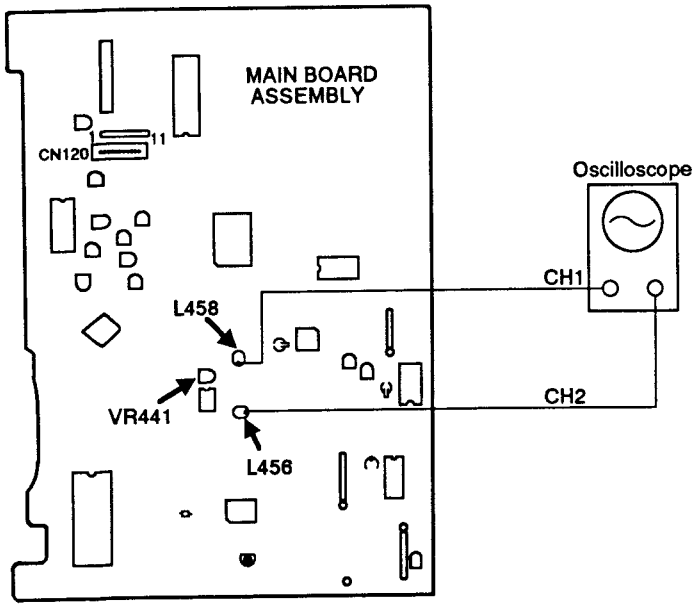
Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• Oscilloscope • 8-inch LD test disc (GGV1003)	• CH1: lead wire of L458 • CH2: lead wire of L456	• Normal mode • Still mode (#3,800)	• VR441 (1H LEVEL)

Adjustment Procedure

1. Connect lead wire of L458 to the oscilloscope's CH 1 and lead wire of L456 to the CH 2.
2. Search for frame #3,800 on the test disc.
3. Adjust VR441 so that the 1H delay video level (CH 1) becomes the same as the main line video level (CH 2). (See Fig. 18)

Note : The video level is the level between the SYNC tip and the white peak.

Connection diagram



Oscilloscope range AC
CH1: 20mV / div 10 μS / div
CH2: 20mV / div

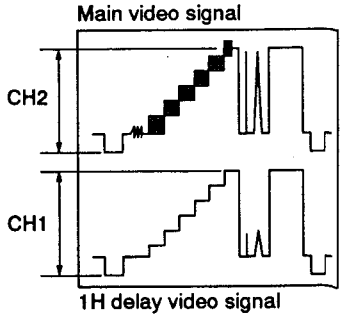


Fig. 18

21. COLOR TINT ERROR SIGNAL LEVEL ADJUSTMENT

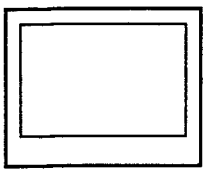
Electrical Adjustment

- Purpose: Optimization of the color tint compensation section's error signal level.
- When not properly adjusted: There is substantial color irregularity. (especiallly for CDV.)

Measurement equipment & jigs	Measurement equipment connecting points	Player condition	Adjusting point
• TV monitor • 8–inch LD test disc (GGV1003)		• Normal mode • Still mode (#8,000)	• VR521 (VPS LEVEL)

Adjustment Procedure

1. Search for frame #8,000 on the test disc. (Magenta screen)
2. Adjust VR521 untill the color irregularity on the magenta screen is minimized.



Color irregularity on the magenta screen is minimized.

7. DISASSEMBLY

1. Disc Tray

①Turn the power switch on and press the EJECT button then pull the tray out from the player.
②Remove two tray stopper screws Ⓐ.
③Pull out the tray toward the front.

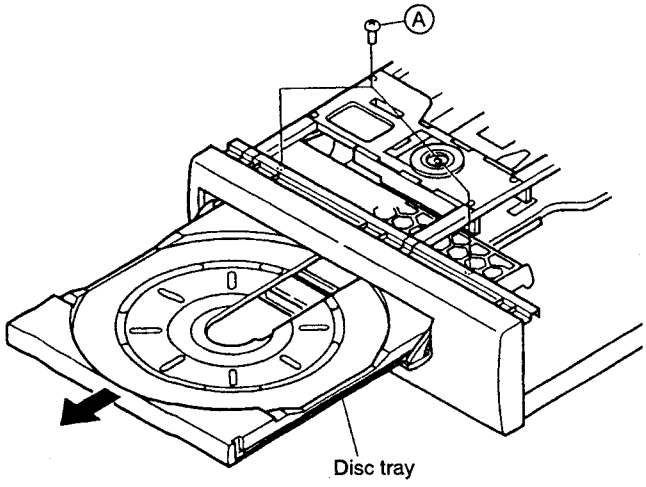


Fig. 1

2. Positioning the Tray

① Set the player with the tray open.
② Set the roller plate gear so that the roller plate line intersects with the mid - point of missing tooth of the roller plate gear.
(At this time, adjust the position by the method shown in Fig. 2, or turn the power ON and use the SKIP (I◀◀, ▶▶I) buttons in the direction of OUT tilt it stops as shown in Fig. 2)
③ Insert the tray.
At this time, the tray can be inserted only when the first missing tooth of the tray gear is engaged with the missing tooth section of the roller plate gear, as shown in the figure. (Fig. 2)

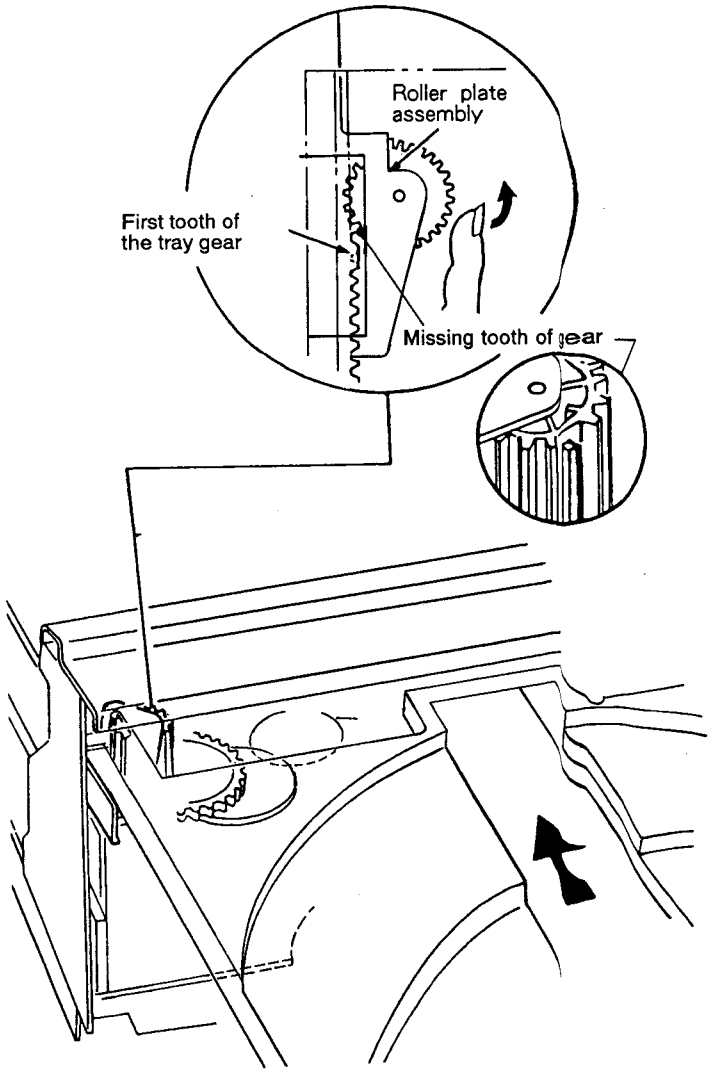


Fig. 2

3. Positioning the Gears and the Grease Apply Points

1. Apply a grease to the spring bus cam.

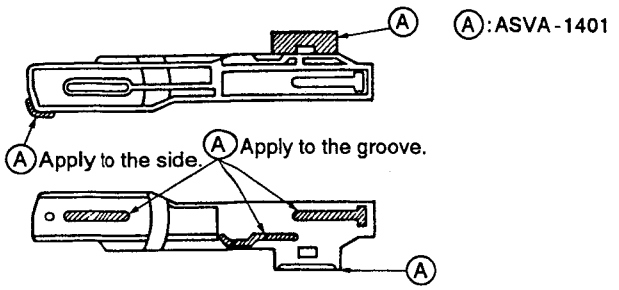


Fig. 3

2. Apply a grease to the cam gear.

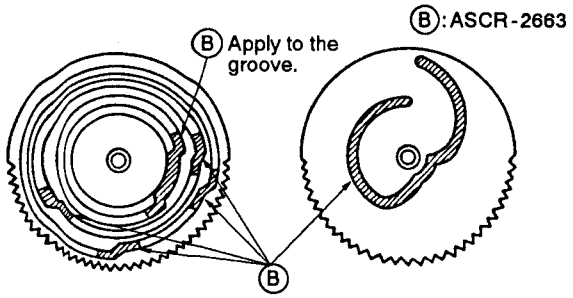


Fig. 4

3. Apply a grease to the follow gear.

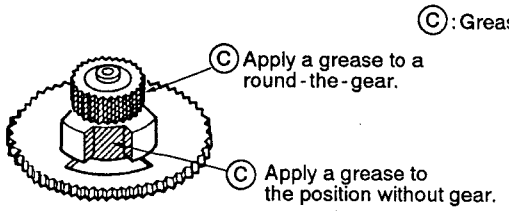


Fig. 5

4. Positioning the cam gear.
   - ① Move two cams in the direction of arrow.
   - ② Move this cam in the direction of arrow.
   - ③ Insert the cam gear so that the end of the cam gear comes to the position nearest to the shaft.
   - ④ Confirm that two cams are moved when turning the came gear to the shaft in the direction of arrow.
   - ⑤ Confirm that the cam is turned when pressing the direct SW.

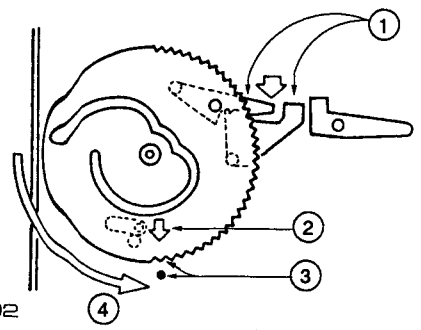


Fig. 6

5. Mount the spring slanting cam
   - ① Set the cam gear as shown in the Fig. 7 and take down the SW.
   - ② Engage the ⓐ of the spring slanting cam with ⓐ'.
   - ③ Set the position of the projection tipped of the tilt base is on the edge of the spring slanting cam. And slide the spring slanting cam in the direction of arrow. (See Fig. 8)

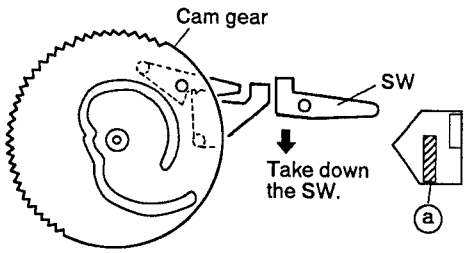


Fig. 7

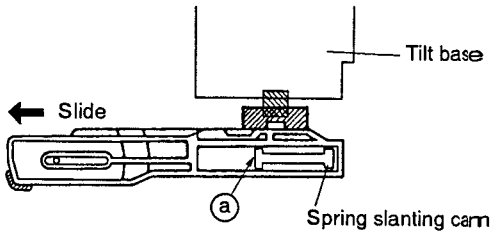


Fig. 8

6. Positioning the roller plate assembly (slide gear).

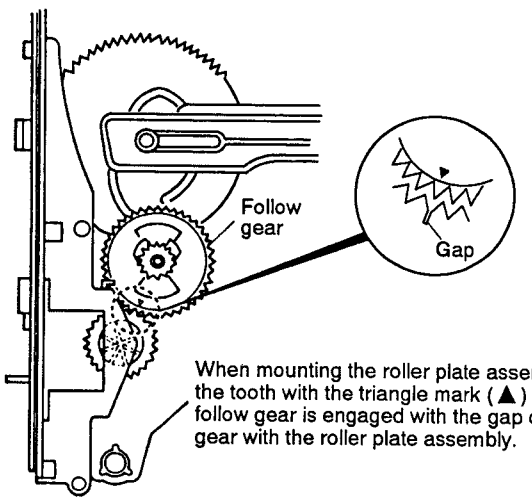


Fig. 9

● How to replace the flexible cable

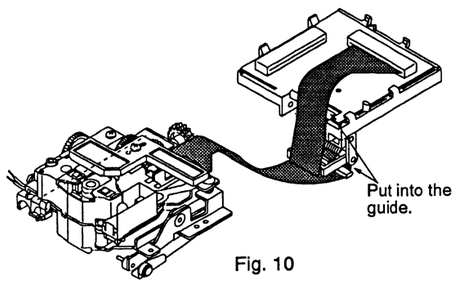


Fig. 10

4. Carriage Assembly

①Slide the carriage assembly to the shaft of the turn plate by hand.

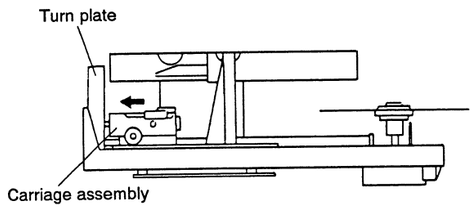


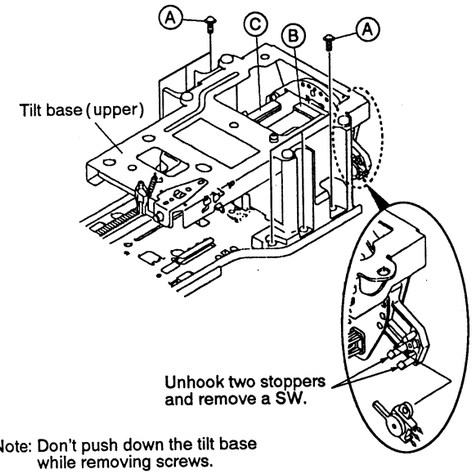
Fig. 11

②Disconnect two connectors Ⓑ and Ⓒ from the CNNB assembly to remove the flexible cable.

③Remove six screws Ⓐ from the post(L) and (R) to remove the tilt base.

④Pull out the carriage assembly by setting the tilt base (upper) toward the upper.

⑤Unhhok two stoppers and remove a SW.



Note: Don't push down the tilt base while removing screws.

Fig. 12

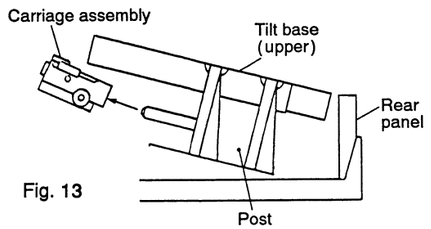


Fig. 13

5. Power Supply Board Assembly

①Insert a screwdriver into the chassis hole near a strain relief through the back of the base chassis and remove the strain releif stop ring.

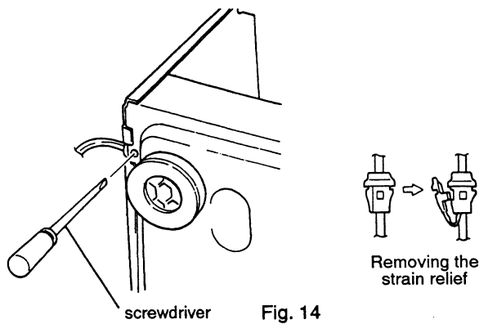


Fig. 14

②Remove four screws Ⓐ and raise the power supply board assembly. Then the power supply board assembly can be diagnosed for component replacement through the foil side.

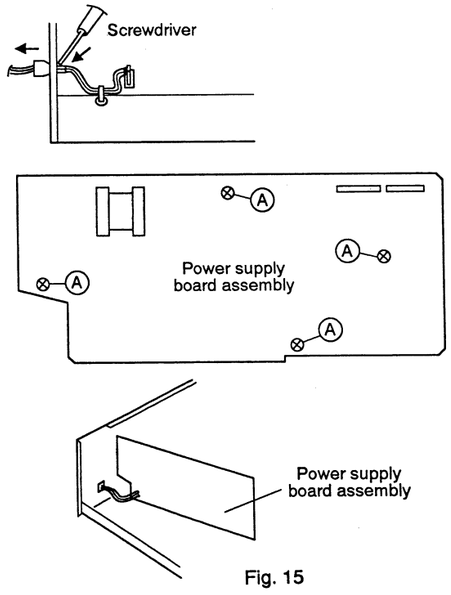


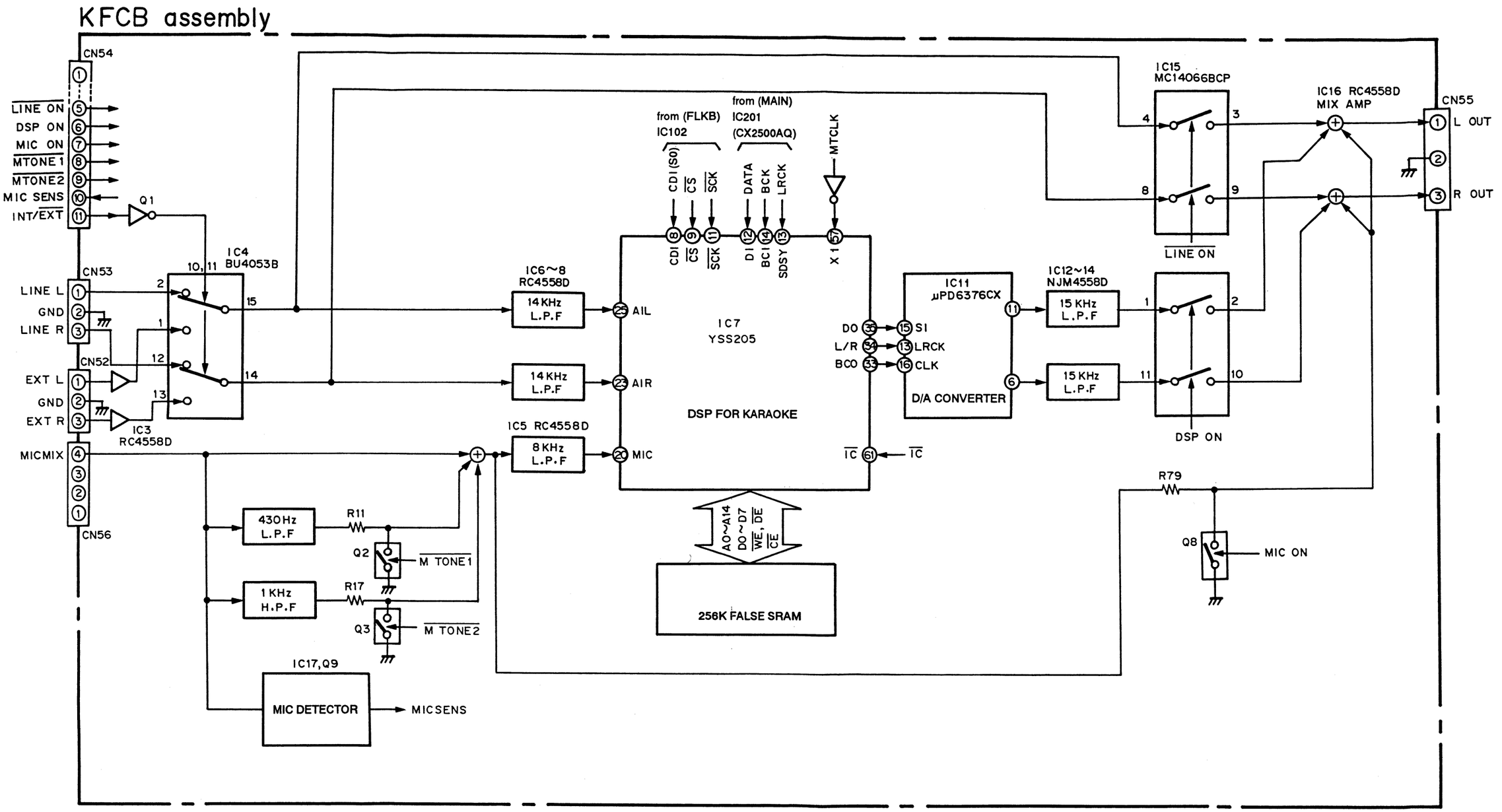
Fig. 15

8. ABBREVIATIONS TABLE

A	
ACCEL	ACCELERATE
ACOM	AUDIO COMPENSATOR
AF	AUDIO FREQUENCY
AFM	ANALOGUE FM AUDIO
AGC	AUTOMATIC GAIN CONTROL
ALC	AUTOMATIC LEVEL CONTROL
ANT	ANTENNA
ATC	AUTOMATIC THRESHOLD CONTROL
B	
BAL	BALANCE
C	
CAV	CONSTANT ANGULAR VELOCITY
CLV	CONSTANT LINEAR VELOCITY
CCD	CHARGE COUPLED DEVICE
CD	COMPACT DISC
CK	CLOCK
CONT	CONTROL
CS	CHIP SELECT
C-SYNC	COMPOSITE SYNCHRONIZATION
CX	AFM NOISE REDUCTION
D	
DEM	DEMODULATOR
DIG/ANA	DIGITAL/ANALOGUE
DL	DELAY LINE
DSP	DIGITAL SIGNAL PROCESSOR
DOS	DROP OUT SENSE
DRV	DRIVER
E	
EFM	EIGHT TO FOURTEEN MODULATION
ERR	ERROR
EQ	EQUALIZER
EXT	EXTERNAL
F	
FCS or FOCS	FOCUS
FG	FREQUENCY GENERATOR
FL	FLUORESCENT LAMP
FTS	FOCUS TRACKING SLIDER
Fsc	CHROMINANCE SUBCARRIER FREQUENCY
FWD	FORWARD
G	
GFS	GET FRAME SYNC LOCK
GND	GROUND
H	
HLD	HOLD
H SYNC	HORIZONTAL SYNCHRONIZATION
I	
INT	INTERNAL
IR	INFRARED RAYS
L	
L-CH	LEFT CHANNEL
LAT	LATCH
LD	LASER DIODE
LPF	LOW PASS FILTER
LIM	LIMITER
M	
MTR	MOTOR
µCOM	MICROCOMPUTER
P	
PD	PHOTO DETECTOR
PB	PLAYBACK
PLL	PHASE LOCKED LOOP
P-ON	POWER ON
R	
R-CH	RIGHT CHANNEL
RTN	RETURN
RFMD	RADIO FREQUENCY MODULATOR
RST	RESET
REV	REVERSE
RF-CORR	RF CORRECTION
S	
SPDL	SPINDLE
SLD	SLIDER
SO	SERIAL OUTPUT
SI	SERIAL INPUT
SCK	SERIAL CLOCK
SYPS	SYSTEM POWER SUPPLY
SW	SWITCH
S/H	SAMPLE & HOLD
SENS	SENSITIVITY
SQ	SQUELCH
T	
TRK or TRKG	TRACKING
TP	TEST POINT
TBC	TIME BASE CORRECTION
TGL	TOGGLE
U	
UNREG	UNREGULATED
V	
V-SYNC	VERTICAL SYNCHRONIZATION
VSQ	VIDEO SQUELCH
VPS	VIDEO PHASE SHIFTER
VDEM	VIDEO DEMODULATOR
VHF	VERY HIGH FREQUENCY
VCA	VOLTAGE CONTROLLED AMPLIFIER
VCO	VOLTAGE CONTROLLED OSCILLATOR
X	
X...	ACTIVATED WHEN LOW VOLTAGE

9. CIRCUIT DESCRIPTION

KARAOKE SECTION BLOCK DIAGRAM



KARAOKE section

This system features KARAOKE functions such as key control, digital echo, one touch KARAOKE, MUSIC/VOCAL balance by digital signal processing using DSP (YSS205) for KARAOKE. Additionally, more functions, surround, vocal effect and chorus are realized.

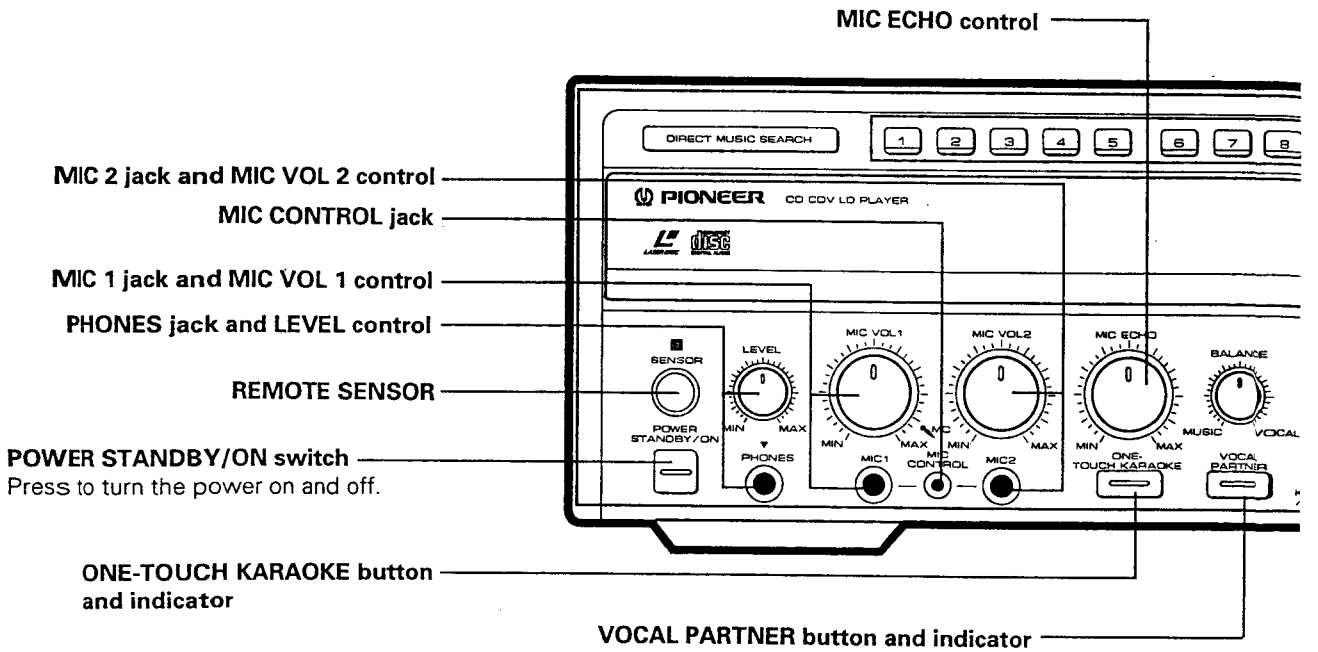
IC9 (YSS205) is controlled by signals from the mode control microprocessor (IC102 in FLKB) to the terminals of Pin ⑧ (CDI), Pin ⑨ ($\overline{CS}$) and Pin ⑪ ($\overline{SCK}$).
Voice processing is also made by IC9 with 256K false SRAM of IC10 (HM65256BLP-10) externally mounted. Three lines of digital, analogue and microphone sound are input to YSS205. Digital sound is input from Pin ⑫ (DI), Pin ⑬ (SDSY) and Pin ⑭ (BCI). Analogue sound is input from Pin ㉕ (AIL) and Pin ㉓ (AIR) through LPF of 14 kHz consisting of IC6 to IC8. Microphone sound is input from Pin ⑳ (MIC) through LPF of 8 kHz consisting of IC5. Analogue and microphone sound are converted into digital signal by the built-in A/D converter. This sound signal is processed in digital signal form. The signal is output from Pin ㉝ (BCO), Pin ㉞ (L/R) and Pin ㉟ (DO) and input to D/A converter of IC11 (μPD6376CX). The output of D/A converter passes through LPF of 15 kHz consisting of IC12 to IC14 and input to IC15 (MC14066BCP) as DSP signal. DSP signal is the addition of disc and microphone sound with signal processed. The LINE signal is also input from CN53 to IC15, and a signal to be output is selected by the control signal from Pin ⑤ ($\overline{LINE\ ON}$) and Pin ⑥ (DSP ON) of CN54. The LINE signal is added with microphone signal (signal not applied with echo) selected by MIC ON at IC16 and become sound output. The theories of LINE ON, DSP ON, MIC ON in each mode are as follows.

LINE ON ··· L: when NORMAL mode. H: when ONE-TOUCH KARAOKE mode.
DSP ON ···· H: when KARAOKE and AUX INPUT mode.
H: when surround and ONE-TOUCH KARAOKE even in normal mode.
MIC ON ···· H: when KARAOKE and AUX INPUT mode.
L: when MAGIC VOICE and MUSIC VOCAL.

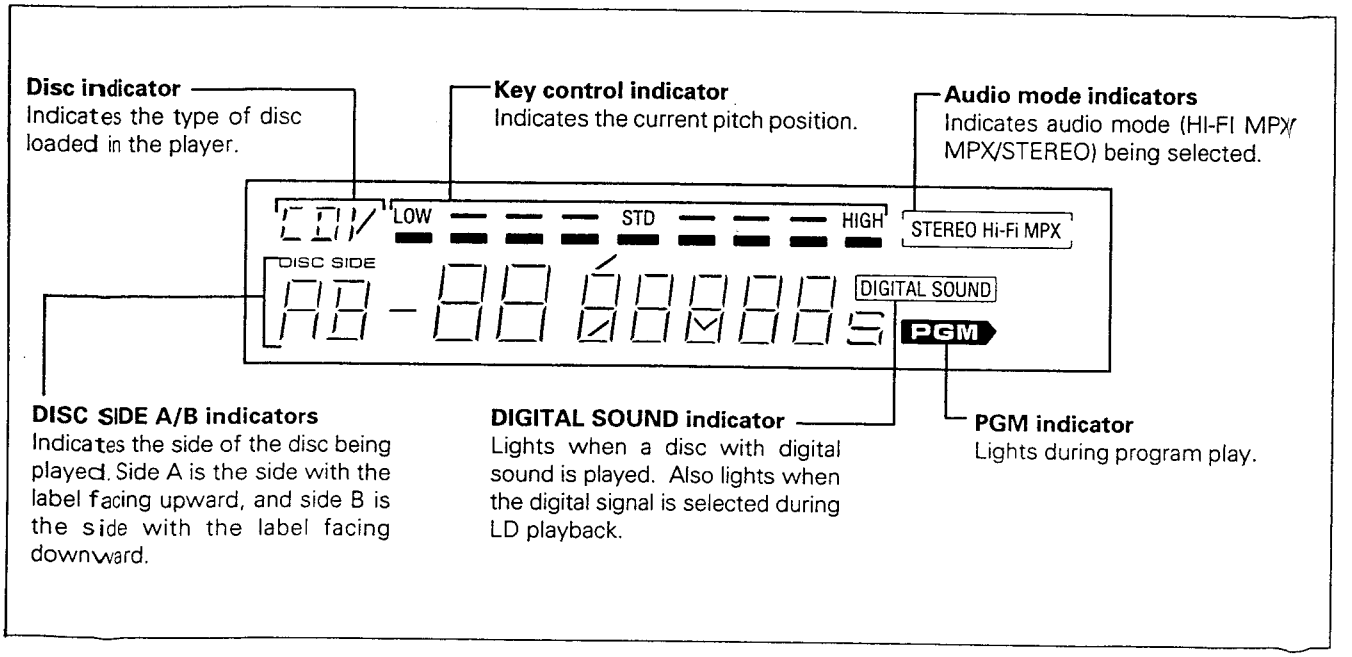
As for the amount of digital echo and MUSIC/VOCAL balance, the output of VR103 and VR104 are converted into digital signal in FLKB by A/D converter of IC101 (TC35097AP), then input to the mode control microprocessor (IC102). This information is sent to IC9 (YSS205) and controlled by digital signal.
There are three surround modes, hall, stage and arena. This is realized by combing delay time and amount. Additionally, there are three types of vocal effect, POPS, JAZZ and BALLAD. This is realized by changing the frequency characteristics of microphone sound and by combing delay time and amount. The frequency of microphone sound is compensated in high range for pops, in low range for jazz and is flat for ballad. These are controlled by $\overline{MTONE\ 1}$ and $\overline{MTONE\ 2}$. For pops, $\overline{MTONE\ 2}$ becomes L and for jazz, $\overline{MTONE\ 1}$ becomes L. Others than above become H. For "ONCE MORE", HALL and JAZZ are selected. For CHORUS, the microphone sound in which key has been changed into two ways is added to the original microphone sound.

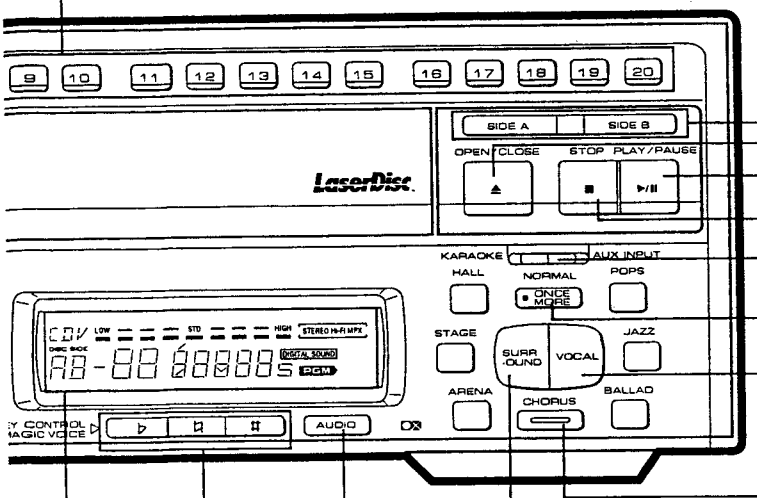
10. PANEL FACILITIES

- Most of the buttons on the front panel are used for Karaoke play.
- A detailed description is provided on the indicated page(s).



Display window





DIRECT MUSIC SEARCH buttons

SIDE A/B buttons
When a two-sided LD is loaded, side A is the side with the label facing upward, and side B is the side with the label facing downward. Depending on how the LD is loaded, the A and B buttons may not correspond with the indications on the label (A, B or 1, 2).

OPEN/CLOSE button

PLAY/PAUSE button

STOP button

KARAOKE/NORMAL/AUX INPUT selector

ONCE MORE button and indicator

VOCAL button

CHORUS button and indicator

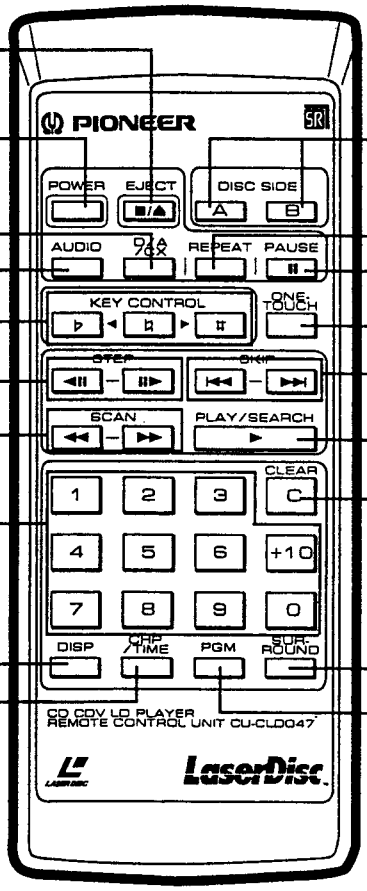
SURROUND button

AUDIO mode button

KEY CONTROL/MAGIC VOICE buttons (CLD-2590K only)

KEY CONTROL buttons (CLD-V820 only)

- A detailed description is provided on the indicated page(s).
- Remote control buttons with the same names or marks as buttons on the front panel of the player control the same operations as the corresponding front panel buttons.



EJECT button

POWER button
Press to turn the power on and off.

D/A/CX button

AUDIO button

KEY CONTROL buttons

STEP buttons

SCAN buttons

Digit buttons

DISP button

CHP/TIME button

DISC SIDE A/B buttons

REPEAT button

PAUSE button

ONE-TOUCH button

SKIP buttons

PLAY/SEARCH button

CLEAR button
Used to clear the repeat mode or program mode. This button is also for use in correcting input digits.

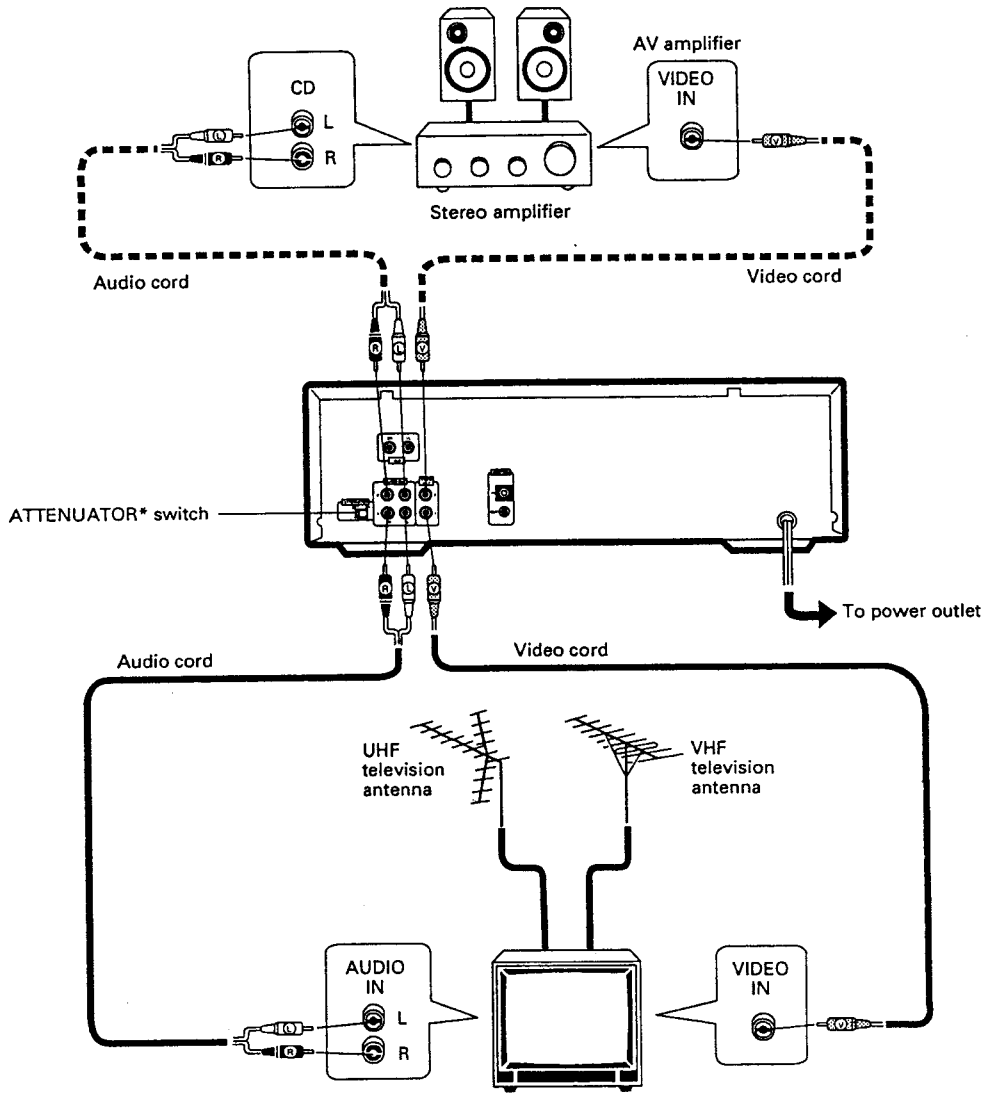
SURROUND button

PGM button

11. CONNECTIONS

USING TELEVISION WITH AUDIO AND VIDEO JACKS

Player, stereo system, monitor television



- Connect the VIDEO OUT jack of the player to the video input jack of the monitor television.
- Connect the AUDIO OUT jacks to the stereo amplifier AUX, CD, LD, VDP or other jacks, except the PHONO input jacks. The television speakers can also be used by connecting the television audio input jacks and the player AUDIO OUT jacks, however connection to a stereo amplifier is recommended to obtain superior audio playback quality for Compact Discs and LaserDiscs. Do not change the television antenna and VCR connections.
- Connect the power cord to an AC wall outlet.
- Combined system control is possible when a Pioneer television and audio/video stereo receiver are connected.

*ATTENUATOR switch

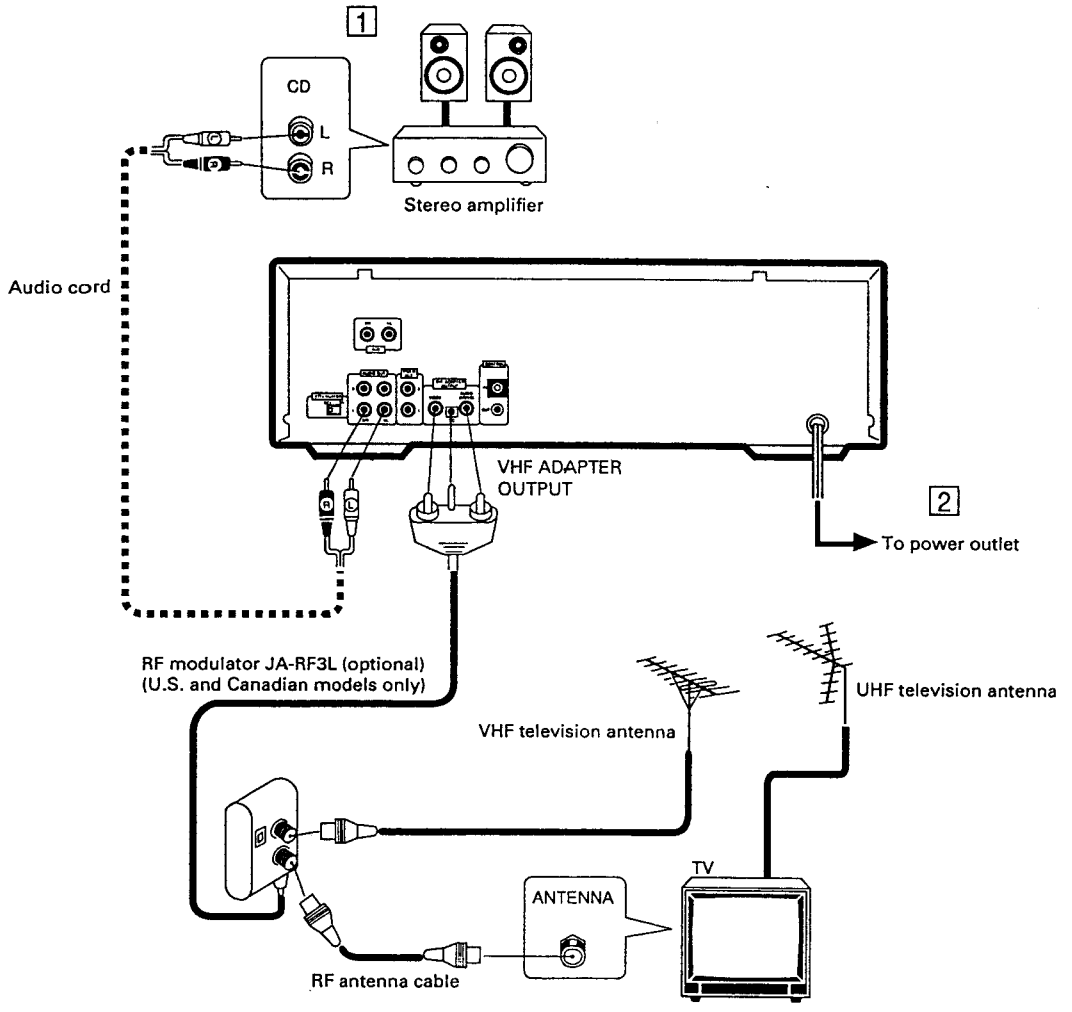
When the television speakers are used, the sound may be distorted. In this case, set ATTENUATOR to ON to reduce the distortion.

USING TELEVISION WITHOUT AUDIO AND VIDEO JACKS (WITH OPTIONAL RF MODULATOR JA-RF3L) (CLD-V820 only)

Player, regular television, stereo system

The numbers are explained on the next page. Make the connections in this order.

- To watch a TV broadcast, turn off the power of this player.
- When the power of this player is turned on, LD playback can be seen on the screen.



1. Detach the VHF antenna cable from the VHF antenna terminal of your TV set, and connect the cable to the VHF IN terminal of the RF modulator JA-RF3L (optional).
2. Connect the VHF OUT terminal of the RF modulator to the VHF antenna terminal of your TV set with the supplied RF cable.
3. Connect the socket (3-pin) of the RF modulator to the VHF ADAPTER OUTPUT jacks.

NOTES:

- *Push the plug in firmly. If the plug is not properly inserted, it may result in snow on the screen or noise.*

When the sound from a LaserDisc or Compact Disc is output from a television speaker it becomes monaural sound. (This is the same as stereo television).

NOTE:

- *Stripe patterns may appear when a LaserDisc is played on a television. Move the antenna cable away from the power cord to avoid this.*
- *Be sure to turn off the power of this player when you watch a TV broadcast.*

12. SPECIFICATIONS

1. General

System ..... LaserVision Disc system and Compact Disc digital audio system
Laser ..... Semiconductor laser wavelength 780 nm
Power requirements
CLD-V820 ..... AC 120V, 60 Hz
CLD-2590K ..... AC 110 - 120V/220 - 240V (Switchable), 50/60 Hz
Power consumption
CLD-V820 ..... 46 W
CLD-2590K ..... 36 W
Weight ..... 8.7 kg (19 lbs 3 oz)
Dimensions ..... 420 (W) x 441 (D) x 139 (H) mm
16-9/16 (W) x 17-3/8 (D) x 5-1/2 (H) in
Operating temperature ..... +5°C ~ +35°C (41°F - 95°F)
Operating humidity ..... 5% ~ 90%
(There should be no condensation of moisture.)

2. Disc

LaserVision Discs

*Maximum playing times
12-inch standard play disc ..... 1 hour/both sides
12-inch extended play disc ..... 2 hours/both sides
8-inch standard play disc ..... 28 min/both sides
14 min/one side
8-inch extended play disc ..... 40 min/both sides
20 min/one side
Spindle motor speed
Standard play disc ..... 1,800 rpm
Extended play disc ..... 1,800 rpm (inner circumference) to 600 rpm (outer circumference)
(For a 12-inch disc)

Compact Discs

DISC ..... Diameter: 5-inch, 3-inch, Thickness: 1.2 mm
Rotation direction (pickup side) ..... Counterclockwise
Liner speed ..... 1.2 ~ 1.4m/sec
*Maximum playing time
74 min. 5-inch discs
20 min. 3-inch discs
(For stereo playback)

Compact Discs with Video

Disc ..... Diameter: 5-inch, Thickness: 1.2 mm
Rotation direction (pickup side) ..... Counterclockwise
Linear speed ..... Audio portion: 1.2 ~ 1.4m/sec
Video portion: 11 ~ 12m/sec
*Maximum playing time ..... Video portion: 5 min. (CLV)
Audio portion: 20 min. (Digital)

** Actual playback time differs for each disc.*

3. Video characteristics (two pairs)

Format ..... NTSC specifications
Video output
Level ..... 1 Vp-p nominal, sync. negative, terminated
Impedance ..... 75Ω unbalanced
Jack ..... RCA jack

4. Audio characteristics (two pairs)

Output level
During analog audio output ..... 200 mVrms (1 kHz, 40%)
During digital audio output ..... 200 mVrms (1 kHz, -20 dB)
Jacks ..... Both RCA jacks
Number of channels 2

5. Other Terminals

Control input/output ..... Both miniature jacks
AUX ..... RCA jacks
Number of channels 2
VHF adapter output (Video/Audio) ..... Both RCA jacks
(CLD-V820 only) with DC jack

6. Accessories

Remote control unit (CU-CLD047) 1
Size "AAA" (IEC R03) dry cell batteries 2
Video cord 1
Audio cord 1
Operating instructions 1
Warranty card 1

7. Functions

Remote control unit operations (CU-CLD047)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Two-side play	YES	YES	NO	NO
	Single-side play	YES	YES	YES	YES
	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
	Eject	YES	YES	YES	YES
Search	Fast forward (forward and reverse)	YES	YES	YES	YES
	Chapter/Track skip	YES	YES	YES	YES
	Direct chapter/Track number search	YES	YES	YES	YES
	Frame number search	YES	NO	NO	NO
	Time number search	NO	YES	YES	YES
	Absolute time search	NO	NO	NO	YES
Program	Chapter/Track program play	YES	YES	YES	YES
	Program correction	YES	YES	YES	YES
Repeat	Chapter/Track repeat	YES	YES	YES	YES
	One-side repeat	YES	YES	YES	YES
	Two-side repeat	YES	YES	NO	NO
	Program repeat	YES	YES	YES	YES
Trick play	Still/Step	YES	NO	NO	NO
Time display	Elapsed time display	NO	YES	YES	YES
	Absolute time display	YES*1	NO	NO	YES
	Remaining track time display	NO	NO	YES	YES
	Remaining total time display	YES*1	YES*1	YES	YES
	Total number of selections, total time display	YES*1	YES*1	YES	YES
Others	CX system ON/OFF	YES*2	YES*2	NO	NO
	AUTO DIGITAL/ANALOG switch	YES*3	YES*3	NO	NO
	Audio channel selection (Stereo, 1/L, 2/R)*4	YES	YES	YES	YES

*1 Only discs with TOC
*2 Valid for analog sound playing a disc with the CX mark.
*3 Can only be used with discs with digital sound tracks.
*4 Only NORMAL mode

NOTE:
The specifications and design of this product are subject to change without notice, due to improvement.